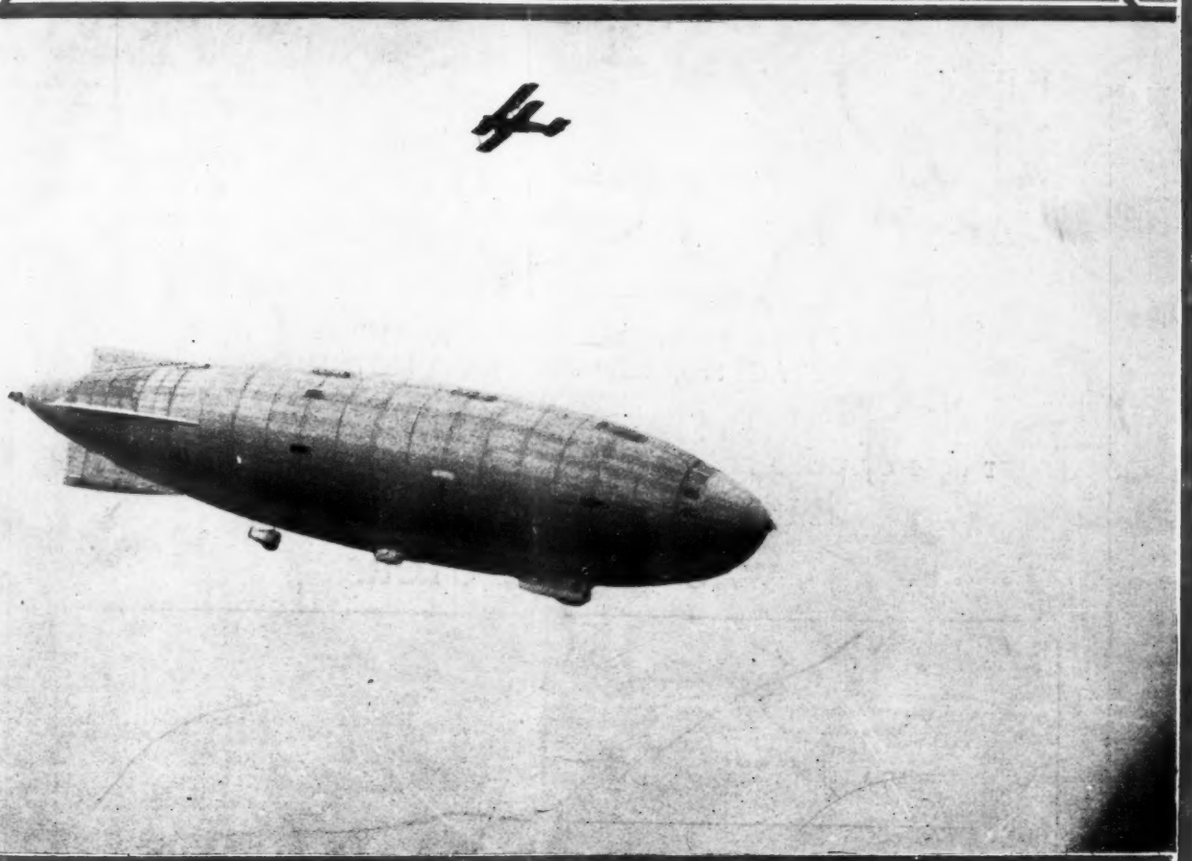
REFERENCE DEPT.

AVIATION

The Oldest American Aeronautical Magazine

MAY 3, 1926 Issued Weekly PRICE 15 CENTS



The Norge Arriving over England, Welcomed by an R.A.F. Plane

VOLUME XX

NUMBER 18

SPECIAL FEATURES

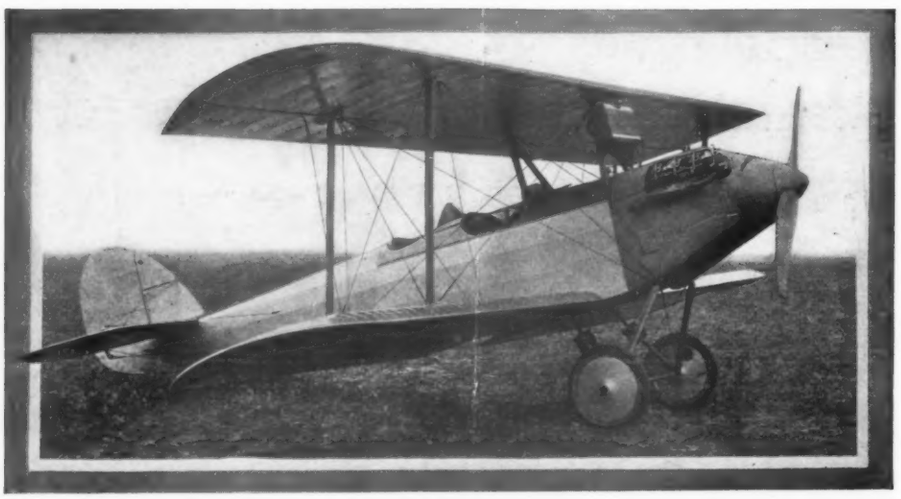
ENGLISH IMPRESSIONS — LESTER D. GARDNER

MIAMI-JACKSONVILLE AIR MAIL OPENED

AUSTRALIAN COMMERCIAL AVIATION

GARDNER PUBLISHING CO., INC.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK
Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office, at Highland, N. Y under Act of March 3, 1879.

WACO



REAL PERFORMANCE IN A THREE-PLACE SHIP WITH STOCK OX5 MOTOR

Regardless of price and regardless of motor used, there is no better airplane than the Waco.

WACO DISTRIBUTORS

NEW JERSEY and DELAWARE The Ludington Exhibition Company Atlantic Building, Philadelphia, Pa.	MISSOURI Waco Sales Company Richard's Flying Field, Kansas City, Mo.
PENNSYLVANIA and MARYLAND Reisner Aero Service Hagerstown, Md.	ILLINOIS The Mid-West Airways Corporation Monmouth, Ill.
NORTH CAROLINA Lloyd O. Yost Box 203, Pinehurst, N. C.	INDIANA Muncie Aerial Company Muncie, Ind.
GEORGIA Douglas H. Davis Griffin, Ga.	MICHIGAN The Aircraft Distributors 2320 N. Saginaw St., Flint, Mich.
FLORIDA Otis A. Hardin Sebring, Fla.	OHIO and KENTUCKY Embry-Riddle Company Lunken Airport, Cincinnati, Ohio.
LOUISIANA The Southern Dusting Co., Inc. Box 216, Tallulah, La.	NEW ENGLAND New England Aircraft Co 805 Main St., Hartford, Conn.
OKLAHOMA The Aircraft Sales Company of Oklahoma P. O. Box 1525, Tulsa, Okla.	WISCONSIN The Roy Larson Aircraft Co. Larson, Wisconsin.

ADVANCE AIRCRAFT CO.
Troy, Ohio

BOEING AIRPLANE COMPANY

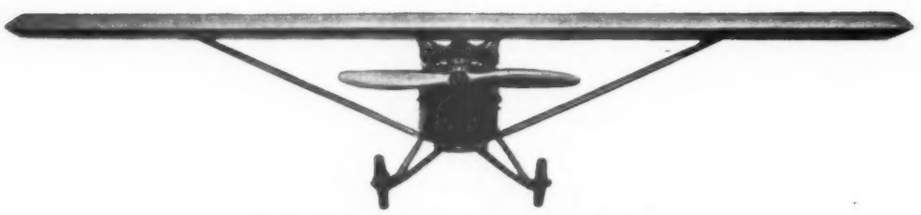
Manufacturers

of

Military and Commercial Aircraft

Seattle, Washington

Approaching Perfection



POWERED WITH WRIGHT WHIRLWIND.

The progress of aviation and airplane design is continuous and rapid.

THE RYAN M-1 is an embodiment of the most advanced commercial design of today. It's super-performance, economy of operation and high factor of safety reflect its careful and scientific engineering.

THE RYAN M-1 cruises at 115 m.p.h. with a 600 lb. pay load. It will take this load off the ground in quiet air with a run of 390 feet, climb to 1,200 feet the first minute, and leveled off, throttle open, it obtains a maximum speed of 135 m.p.h., throttled down it will float at 45 m.p.h. for a short landing.

THE RYAN M-1 with it's all steel tube fuselage, one unit wing construction, and a gliding angle of 10-1, is a sensational airplane value. It represents a new slogan for commercial airplane operators:—"ECONOMY PLUS."

$8,400 Whirlwind Equipped.

RYAN M-1

"The plane that pays a profit."

MANUFACTURED BY

RYAN AIRLINES, INC.

General Office and Factory

SAN DIEGO, CALIF.

MAY 3, 1926

AVIATION

VOL. XX. NO. 18

Published every Monday

CONTENTS

Editorials 659
English Impressions 660
Ford Air Transport Reports Favorable Year 662
The Growth of the Australian Airline 663
Miami-Jacksonville Air Mail Opened 665
The Field of Aeronautical Engineering 666
The Pander Type E Sportplane 668
The Udet Kondor Airliner 674

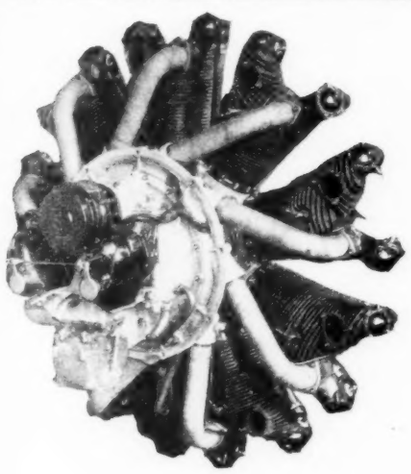
GARDNER PUBLISHING COMPANY, Inc., *Publishers*

BUSINESS AND EDITORIAL OFFICES: 225 FOURTH AVENUE, NEW YORK
CABLE ADDRESS: AEROENG
Publication Office
HIGHLAND, N. Y.

Subscription price: Four dollars per year. Canada, five dollars. Foreign, six dollars. Single copies, fifteen cents. Back numbers 25 cents. *Copyright 1926, by the Gardner Publishing Company.*

Issued every Monday. Forms close ten days previously. Entered as second-class matter Nov. 22, 1920, at the Post Office at Highland, N. Y., under act of March 3, 1879.

SCINTILLA



The new 400 h.p. 9 cyl. Pratt & Whitney "Wasp" radial air-cooled engine. This latest American radial engine weighs only 1.69 lbs. per horsepower and is equipped with two Type AG 9D SCINTILLA Aircraft Magnetos.

No. 6 in a series of modern American aircraft engines for which SCINTILLA Aircraft Magnetos have been selected as ignition equipment.

AIRCRAFT Engineers and Pilots insist upon ignition equipment of the utmost dependability.

BECAUSE SCINTILLA Aircraft Magnetos have notably met this requirement they have been adopted for most of the modern American military and commercial engines.

Contractors to the U. S. Army and Navy.

SCINTILLA MAGNETO COMPANY, INC.

***Factory and Offices* SIDNEY, NEW YORK**

SEND FOR DESCRIPTIVE BOOKLET

SEVERE SERVICE

The Fairchild Aerial Surveys Co., Ltd., of Canada, have been using Curtiss-Reed metal propellers for over two years under widely varying operating conditions. They tell us:

"Having had such wonderful service from your Curtiss-Reed propellers, not to mention increased performance, we feel it our duty to offer you conclusive evidence showing the extremely severe conditions under which these propellers are operating. They are still in excellent condition."

Curtiss-Reed Propellers

Withstand Spray - Rain - Hail - Heat - Cold.

LET US QUOTE ON A PROPELLER FOR YOUR SHIP. USE THE BLANK

THE CURTISS AEROPLANE & MOTOR CO. INC.,
Garden City, N. Y.

Gentlemen:

Without obligation to me please quote prices and delivery on———Curtiss-Reed propellers for the following installation:

Name of Ship_____

Motor———Model———H.P.———R.P.M. (Full throttle, level flight)———

Diameter of Propeller now used———Pitch———If geared, state gear ratio———

Actual high speed with present propeller———NOTE: We find that many pilots over-estimate their high speeds. Accurate information on this point is necessary in designing an efficient propeller.

Maximum possible diameter for new propeller———(State the maximum diameter you can swing and still have proper ground clearance).

Name and Address_____

Curtiss

L. D. GARDNER
PRESIDENT
EARL D. OSBORN
VICE PRESIDENT
L. D. WEBSTER
TREASURER
GEORGE NEWBOLD
BUSINESS MANAGER

AVIATION

W. LAURENCE LEPAGE
EDITOR
VIRGINIUS E. CLARK
RALPH H. UPSON
CONTRIBUTORS

VOL. XX MAY 3, 1926 No. 18

The Norge in the Arctic

THE FLIGHT of the Italian semi-rigid airship Norge from Italy to Russia via England and Norway marks the commencement of what may prove one of the most notable and significant long distant airship flights ever undertaken. In successfully completing the European section of the flight, the airship has undoubtedly exhibited, to a certain extent, at least, her general airworthiness, although the flight across Europe offers minor complications and difficulties when compared with that section of the Amundsen-Ellsworth undertaking which is shortly to be commenced upon, namely, the flight into the Arctic and across the North Pole.

An idea of the severity of the problems which will have to be faced in the attempt to fly the Norge in Arctic regions has already been indicated by the difficulties which were experienced in the flight just concluded. It will be remembered that, both in the section of the flight from Pulham to Oslo and also from Olso to Leningrad, the airship lost its course to no small extent as a result of the prevalence of fog and mist. In this respect, therefore, it must be recollected that, at the time at which Amundsen will be ready to make the attempt on the Arctic secrets, that region will be entering upon its accepted foggy season and the difficulties of navigation under such conditions, serious as they have proved in the thickly populated areas of Europe, will prove far more serious under the stressing conditions of the Arctic. With the undoubted experience which Captain Amundsen has of Arctic navigation, however, there is a very good chance of success from this standpoint.

The Amundsen-Ellsworth expedition in itself is of interest since it is the only one of the four expeditions already operating or planning to operate in the Arctic regions this year, which is undertaking the problem of Arctic exploration with the aid of the lighter-than-air airship, rather than the heavier-than-air airplane. Since very early days have explorers considered the possibilities of reaching the two poles by air. Amundsen's attempt with the aid of the Norge is by no means the first in which this class of aircraft has been employed. As long ago as the year 1897 André made a similar attempt, using a spherical balloon with the intent of drifting across the North Pole. This intrepid explorer was never again heard of. Wellman, too, as recently as the year 1909, attempted to fly to the North Pole, using, in this case, an airship, in some respects similar to, though very much smaller than, the Norge. Wellman, it will be remembered, returned without having reached his objective, but still confident that the achievement could, in this manner, be accomplished. Each of these expeditions, it is further interesting to note, started from the European side, at Spitzbergen, from which point it is Amundsen's plan to set out in the Norge.

The Norge, an airship of 640,000 cu. in. capacity, has a cruising range of approximately 3,500 miles, which is almost double the distance which it will be necessary to cover in the proposed non-stop flight across the Arctic. The distance from Spitzbergen to the North Pole is 600 miles and that from the Pole to Alaska, 1,200 miles, which means that the Norge will carry a fair reserve of fuel for the entire flight, which should be successful so long as continued adverse winds are not encountered or an undue quantity of ice and snow collects upon the envelope of the ship, which is said to be one of the possibilities in the case of airship travel in the Arctic region.

On Engine and Plane Development

THE FIGURES which are being published in AVIATION of the mileage flown in 1925 by commercial and amateur pilots show that there has been an enormous development of civilian aviation in this country. This flying has been greatly fostered by a cheap and extremely reliable power plant. While the OX series weighs far more than a modern engine, it is not economical in fuel consumption and it has made possible the development of a series of new commercial planes which have proved that they are practical and can earn money. The Navy development of the 200 hp. air-cooled engine has enabled plane manufacturers to obtain, at a reasonable price, an engine which can and has been fitted to a large number of new types of commercial planes and, in fact, has made many of these types possible.

The building of an experimental airplane requires only a small amount of shop equipment, as most of the work can be done by hand. The building of an engine, however, requires a vast amount of expensive and complicated machinery, all of which must be adjusted and reset in order to produce a single engine. The engineering and "working out the bugs" also seems to be much more difficult in the case of an engine. As a result there have been far fewer new types of engines built than there have been planes. To sell an engine at a reasonable price, it is necessary to produce it in quantities. Unfortunately there is little or no civilian demand for a new type of engine until planes have been designed to use such an engine successfully. This takes a long time and there are few engine manufacturers who are in a position to carry the development expense over such a long period.

The government alone can order new engines and design planes to fit them, and it is probable that, in the future as in the past, commercial aviation engines will be derived from engines originally designed for military use. As matters stand today, there is only one post war aviation engine, except in the very expensive high power class, around which a commercial designer can build a plane. There are several small civilian engines under way and if the government is sincere about fostering the development of civilian aviation there is no way which they could do more good than by placing a quantity order which would enable the manufacturers to produce these new engines at a reasonable cost.

English Impressions

First News from a Long and Extended Air Tour.

By MAJ. LESTER D. GARDNER
Publisher, AVIATION

London, April 2.

AN ENGLISH visitor to the United States was discussing with an American the varying degrees of politeness, courtesy and hospitality to be found in England and America. The excess of European politeness was criticized by the American as unnecessary and a waste of time. The guest from overseas replied: "Politeness and courtesy are like the air in an automobile tire; it is not necessary, but it makes traveling so much easier."

This, perhaps, is the outstanding impression that is received by an aeronautical visitor to Europe. He is greeted by aviation friends with such overwhelming evidences of cordiality that he soon feels that these courtesies are only another evidence of the world wide spirit of comradeship that exists among airmen everywhere.

It is not the purpose of the series of articles that will be sent to AVIATION during the next few months to relate personal experiences, except as they may help to interpret to American aviation readers the trend of aeronautical affairs overseas. The military and commercial air developments of Europe are, of course, of the greatest interest and almost immediately the impression is received that aviation in Great Britain is being taken with the greatest seriousness.

A visit to Croydon, with English, French and Dutch aircraft arriving and departing, gives to Americans a new idea of the possibilities of air transport. It was a fortunate circumstance that the second anniversary of the starting of the Imperial Airways was celebrated at a time when it was possible for AVIATION readers to receive some first impressions.

New Twin-Engine Airliners

The occasion was made an aeronautical event of real significance by the delivery, on one day, of four of the new Handley Page W-10 twin-engine (Napier "Lions") airplanes. To adequately celebrate the change from a single-engine service to a twin-engine service, a fleet of seven of these Handley Page twins and one of the three-engine Handley Pages (air-cooled Armstrong-Siddeley "Jaguars") were placed on the line for a review by the Secretary of State for Air, The Rt. Hon. Sir Samuel Hoare. Lady Maud Hoare, wife of the Air Minister, christened the four new machines by pulling, in each case, a rip cord which revealed the name of the new plane and released several white doves at the same time. The air transports were named after British cities, Ottawa, Pretoria, etc., but one was considerately named City of New York. It was the only one with "dry" engines and much humor was gained from this fact by the English guests.

As the guest of Maj. G. E. Woods Humphrey, Managing Director of the Imperial Airways, many exceptional courtesies were extended. A seat at Table A 1 for the luncheon, next to Alan Cobham and Charles Grey of *The Aeroplane*, was greatly appreciated. Mr. Cobham is, as every airman knows, the world's greatest commercial pilot, having flown more cross-country trips in Europe, Asia and Africa than any other flier. He had just returned to London from his long survey, for the Imperial Airways, to Cape Town via Italy, Greece, Egypt, the Soudan and South Africa. His every effort is for the popularization of aviation through demonstrations by safe long flights; never personal glory. He has just been awarded the Brittania Trophy for the greatest flying achievement of 1925.

The Two Year Statistics

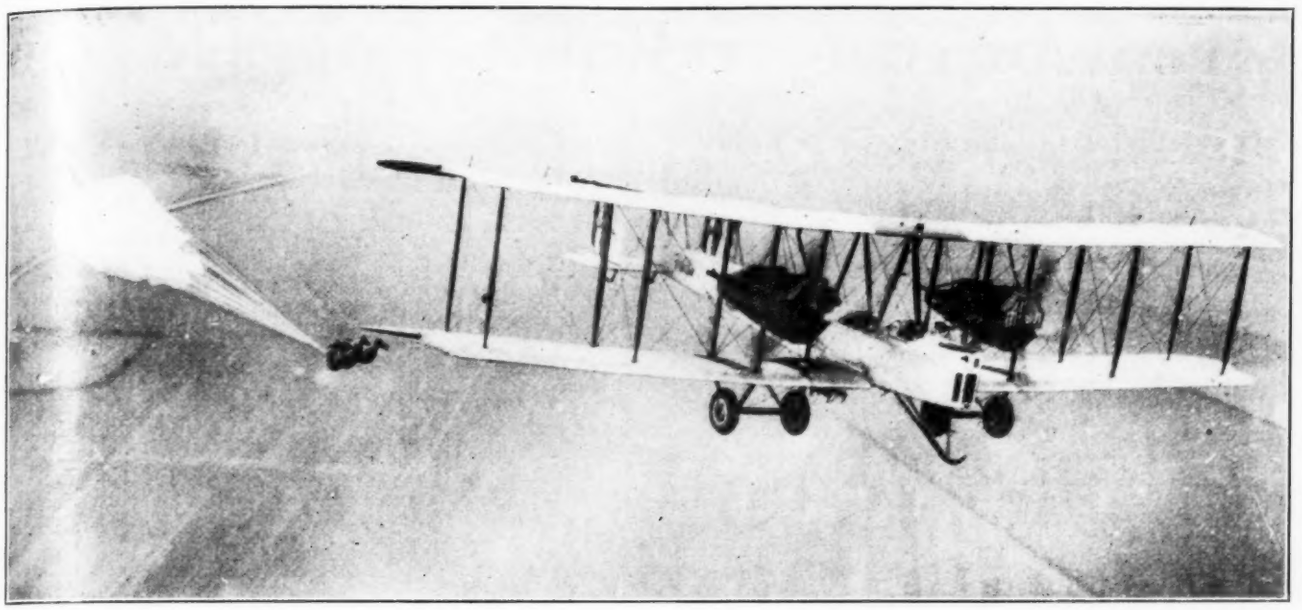
After lunch, Sir Eric Geddes, Chairman of the Imperial Airways, in proposing a toast to Lady Maud, pointed to the future development of this English air transport company as imperial in scope as well as in name. With the opening of the regular line from Cairo to Karachi, India, the first link will be forged in the chain of air lines from London to Australia. He spoke of the 23,000 passengers that had been carried, in the two years of operation. The total mileage has been 1,700,000 miles. One passenger had made 40 trips and one machine, a DH 50, had flown 310,000 miles in 3,200 hr. Sixty per cent of all the passengers had been women,—which cheered the reticent little wife of the writer, who also hopes to tour Europe by the air lines.

Sir Samuel, in responding to the toast to his wife, made a speech in which he made it clear that one of his greatest interests was to assist in the advancement of commercial aviation.

After luncheon, the guests and their wives were given a delightful hop in the new planes, the Publisher of AVIATION and his wife being accompanied by Col. M. O. Darby, Managing Director of the A.D.C. Aircraft, and Maj. J. P. C. Cooper, Inspector of Accidents of the Directorate of Civil Aviation of the Air Ministry. The latter had no occasion to make any use of his expert knowledge on the trip, which gave

Underwood & Underwood

The new Handley Page airliners for Imperial Airways lined up for inspection at the London airport, Croydon. The three-engine (dry) airliner, the City of New York, is the fourth in line from the right.



P & A Photos.

A practice jump from a Vickers Vimy bomber at the British Royal Air Force School at Henlow, England

a good opportunity to see the Croydon airdrome and surrounding country from the air.

Later, it is hoped that a detailed account of the operations of the Imperial Airways will appear in AVIATION.

Dinner at Royal Aero Club

The traditions and distinguished membership of the Royal Aero Club were made very apparent on the first visit to this delightful clubhouse. A dinner had been arranged by our old friend and contemporary, Charles Grey, Editor of *The Aeroplane,* who visited the United States two years ago and gave to the readers of AVIATION such an interesting series of impressions of his visit. The aeronautical industry of England was represented by men known all over the world for their achievements in design and manufacture of aircraft.

T. O. M. Sopwith of the H. G. Hawker Engineering Co., whose pioneering efforts in Europe and the United States are well known, gave a most cordial welcoming address. F. Handley Page was suffering a mild case of "flu", but it requires more than illness to depress his bubbling wit and good humor. C. R. Fairey, with his bigness of mind and body, would have delighted every AVIATION reader by his comments on the regulation of aircraft. His introduction of Curtiss engines and planes, as well as the Reed propeller, into England, of course, created a sensation in the aeronautical industry but his factory appears to be extremely busy. Capt. P. D. Ackland, Manager of the Aviation Department of Vickers, of whom more at a later time, H. T. Vane, Managing Director of D. Napier and Son, Maj. G. E. Woods Humphrey, Managing Director of Imperial Airways, Ltd., F. G. T. Dawson of The Fairey Aviation Co., who has visited the United States often in the last few years, Col. M. O. Darby, Managing Director of the A.D.C. Aircraft, and John Lord, Managing Director of the Avro Company, also honored the visitor with their presence.

Again the Question of Regulation

The topic of most live interest in English aeronautical circles, now that the appropriations for next year have been fixed, is very much the same as our own, with a difference in direction. We want mild regulation of aviation, whereas the English want a modification, so that there can be a greater commercial development. No subject seems to have as great an interest to aircraft manufacturers in England as the commercial air activities in America. They are greatly impressed with the total mileage flown by our unregulated fliers and the activities of the new air transport lines starting this summer.

The honor done to the representative of AVIATION was accepted with the greatest appreciation on behalf of the readers. The complete absence of the customary reserve, that is so characteristic of the English, indicated that the problems of airmen all over the world were becoming so similar that a bond of union now exists that breaks down the traditional barriers of custom. The expressions of regret from many who were away from London or who, by previous engagements, were prevented from attending, give an indication that on our return to England in June many new friends will be made.

In the few days at our disposal, before starting on an air tour of the continent, a quick visit was made to the manufacturing works of A. V. Roe & Co., where Mr. Roe, the pioneer of English flying, was most hospitable. Even before the Leviathan had docked, we were greeted by Capt. H. Biard, the famous pilot of the Supermarine Mystery Plane, of which so much was expected at the Schneider Cup races at Baltimore. Captain Biard, who was one of the winners of the Schneider Cup before the American successes, regretted that there would be no British entries this year and expressed the hope that if the Cup were won permanently, another, which would have as distinguished a history, would be forthcoming. He brought an invitation from Com. James Bird, Managing Director of the Supermarine Company to be his guest. Time was not available to accept this invitation but an outside view of the works was most impressive.

Factory Visits

One of the two works that were visited, in addition to that of A. V. Roe and Co., was the great plant of Vickers at Weybridge, which adjoins the famous Broklands automobile race track. A description of the Vickers works, a most interesting factory, will appear in AVIATION later, but, to see eight Victoria's, troop carriers, each capable of carrying 25 passengers, all being assembled, was a sight worth making a long voyage to see. The Fairey Aviation Co., at Hayes seemed to be very much like the American factories. Fairey Fawns, Flycatchers and other famous products of this excellent company, will be described later. To see Curtiss D-12 engines, known in England as Fairey Felixes, being made alongside Reed propellers was a sight to gladden an American visitor's heart.

A visit to the Air Ministry which is located in Whitehall at Gwydyr House, the center of British Air officialdom, and to Adastral House, the headquarters of the Royal Air Force, brought to mind many very pertinent comparisons with the way aviation is being operated in the United States, but, for reasons which may appear later on, the very pleasant task of recording these impressions will have to be postponed until a later date.

Ford Air Transport Reports Favorable Year

Over 1000 Trips, Carrying Large Loads of Freight and Express, Made During Past Year of Operation.

APRIL 13 was the first anniversary of the opening of the Ford Air Transport which, during the year just ended, has established a remarkable record, demonstrating the practicability and efficiency of airplane transportation. In observance of the day, the daily flight to Chicago was made by the Maiden Dearborn 1, with Eddie Hamilton in the cockpit,—the same plane and the same pilot who inaugurated the service a year ago.

Together with the report which covers the year's operation of the air service, two important developments, each a safety factor, were announced by the Ford Motor Company. The first is the experimentation with the radio beacon by means of which flying is made virtually independent of visibility conditions. The second is the decision to standardize upon multi-engine monoplanes in the company's air service.

Ford flying began on April 13, 1925, when the all-metal airplane, Maiden Dearborn 1, built by the Stout Metal Airplane Company, now a division of the Ford organization, left the Ford Airport at Dearborn for Chicago with 1,000 lb. of freight, cheered by Henry and Edsel Ford and a large crowd and welcomed by prominent Chicagoans at Maywood Field upon its arrival there, less than 2½ hr. later. Later, a second line was established between Detroit and Cleveland and, on Feb. 15, this year, Ford planes began carrying U.S. mail, connecting Detroit with the trans-continental air mail lines.

Maiden Dearborn 1 Has Record

Over 1000 trips have been made by the Ford planes during the year, covering a distance equal to more than eight times around the world and at a rate of about 100 m.p.h. Incidentally, the Maiden Dearborn 1, which made the anniversary Chicago flight on April 13, 1926, has a record of 302 trips during the year, carrying 298,008 lb. of freight over 68,632 miles.

The report of the operation of the Ford Air Transport, given out by the company, shows that, during the year's flying, there has not been a single accident and no one injured. Practically no changes have been made in the planes which are the same today as at the beginning.

Of the 663 trips undertaken during the year on the Chicago line, 649 were completed, showing an efficiency record of over 97 per cent. In trips to and from Chicago during the year, Ford planes covered 165,495 miles, were in the air 1791 hr. and carried 635,221 lb. of Ford express and freight in addition to U.S. Mail since February 15.

Over 99% Efficiency

An even greater degree of efficiency was established on the Cleveland route, which, however, is shorter. Of 457 trips undertaken on this line, 453 were completed, an efficiency record of a little better than 99 per cent. On the Cleveland line, the planes, since July 1, have been in the air 688 hr., have covered 57,531 miles and have, in addition to the mail, carried 409,181 lb. of freight.

During the year's operation of the Chicago lines only 21 scheduled trips were cancelled because of weather conditions, chief of which was poor visibility. During the same period there were 11 landings due to engine trouble such as failure of the water system, gasoline supply and ignition. Bad weather, which made it impossible for the pilot to see, resulted in 28 landings because of the hazardous conditions.

On the Cleveland line since July 1, ten scheduled trips have been cancelled because of bad weather and there have been 11 landings, 7 due to engine trouble and 4 to weather conditions.

Efforts will be devoted during the coming year to overcoming the hazards of bad weather, with attendant poor visibility, and to a reduction of engine troubles.

As a means of overcoming the weather handicap, the Ford Air Transport will try out the radio beacon. The operation of this instrument gives a definite course, giving constant signals by means of which the pilot knows when he is on the course and is warned when he veers from it either to left or right.

Three-Engine Planes

Planes manufactured from now on by the Stout Metal Airplane division of the company will be of the multi-engine type with three air-cooled engines. These will give to the plane sufficient power to continue in flight if one engine should fail and ample power to maneuver into a safe landing even if two of the engines should fail. In this way the hazard of engine trouble will be greatly reduced.

The Ford planes are designed to carry a pay load of 1,500 lb., but at no time during the year has a capacity pay load been carried, except on the first trip to Cleveland, when parts for a complete Ford runabout were transported from Detroit to the Cleveland municipal landing field where the car was assembled. The weight of the pay load was purposely kept to around 1,000 lb. in order to give the planes a maximum load of gasoline as a safety measure in case of unexpected weather conditions.

Ground Equipment

Development of the Ford Air Transport during the year has included leasing of a hangar site at Cleveland, purchase of a landing field, just South of Chicago, and expansions at the Ford Airport at Dearborn. A new hangar is under construction at Cleveland, plans have been completed for a hangar and service building at the new Chicago field, one of the largest hangars in America is now being erected at the Ford Airport in Dearborn and construction has begun on a new manufacturing plant there for the Stout Metal Airplane Company, to replace the plant which was destroyed by fire a few months ago. The new manufacturing plant will be three times as large as the former. At present, the Stout division is housed in one of the buildings at the Dearborn Engineering Laboratory group where construction of the first three-engine plane is already under way.

During the year the personnel of Ford fliers was increased from one to eight pilots.

Cleveland-Louisville Air Mail

According to an announcement of Postmaster General New on April 14, sealed proposals will be received at the office of the Second Assistant Postmaster General until 12 o'clock noon, June 14, 1926, for carrying United States Air Mail on the following described route by the most advantageous schedule in safe and suitable aircraft.

Cleveland, Ohio, by Akron, Dayton and Cincinnati, Ohio, to Louisville, Ky., and return. The schedule will provide for six round trips per week.

The contractor will receive and dispatch mails at the Government air mail field at Cleveland, and will be permitted to use such portion of the Government lighted airway as may be necessary. Contracts are limited by law to not exceeding a four-year term, the announcement said.

Schedule will be as follows:

Leave Cleveland	3:00 a. m. E. T.	Leave Louisville	6:00 p. m. C. T.
Leave Akron	3:35 a. m. E. T.	Leave Cincinnati	7:30 p. m. C. T.
Leave Columbus	4:15 a. m. C. T.	Leave Dayton	8:15 p. m. C. T.
Leave Dayton	5:15 a. m. C. T.	Leave Columbus	10:15 p. m. E. T.
Leave Cincinnati	6:15 a. m. C. T.	Leave Akron	11:45 p. m. E. T.
Arrive Louisville	7:30 a. m. C. T.	Arrive Cleveland	12:05 a. m. E. T.

The Growth of an Australian Airline

Passenger Air Transportation Service Connects Important Railroad Terminals.

AUSTRALIA IS a country of great open spaces with even less population than the Rocky Mountain areas of the United States. The Province of Queensland, which lies in the Northeast corner of the continent, has three major railroads running from the coast, directly inland. The Queensland and Northern Territory Aerial Services, Ltd., frequently abbreviated into "Qantas", runs from the southern railhead at Charlesville to Camooweal, a point somewhat beyond the most northern railhead. The line is 825 miles in length and it enables passengers to travel directly from one point in the interior to another, without going to the coast and then back again, as is necessary by rail. It thus makes a great saving in time, amounting, for certain trips, to almost a week. Furthermore, the distances are so much shorter by air that the fares are only slightly above those of the railroad.

The formation of the Qantas dates from the winter of 1920 when Fergus McMaster, A. N. Templeton and P. F. McGinness and Hudson Fysh (late A.F.C. pilots), met in Brisbane and discussed the necessary preliminary arrangements. By the end of the year, the company had been duly incorporated and the capital raised for the flotation of the pioneering venture.

The Nucleus

In February, 1921, the company's first two machines, in charge of pilots McGinness and Fysh and accompanied by A. Baird as engineer, arrived in Longreach and proceeded to exploit the possibilities of the western Queensland districts from a joy riding and aerial taxi point of view. From then on, until the end of July, some very extensive tours were carried out, including a trip to "Austral Downs" in the Northern Territory, Ingham on the Northeast coast and a journey to Windorah on Coopers Creek and Hungerford on the New South Wales border. During these trips, 21,450 miles were flown, 871 joy ride passengers carried and 79 aerial taxi passengers landed in safety at their destination.

Meanwhile, the great possibilities which were centered in linking by air the railheads of the western Queensland had not been overlooked, and, by August, 1921, the directors, of the Qantas, headed by Fergus McMaster, had been so successful in the direction of obtaining a Government subsidy for the Charleville-Cloncurry route that a new prospectus was issued, calling for further capital for flotation purposes. A further 6 months hard work saw the bulk of the capital raised, and, in February, 1922, the company's tender for the carrying out of the air mail contract was accepted by the Civil Aviation Department.

Equipment Difficulties

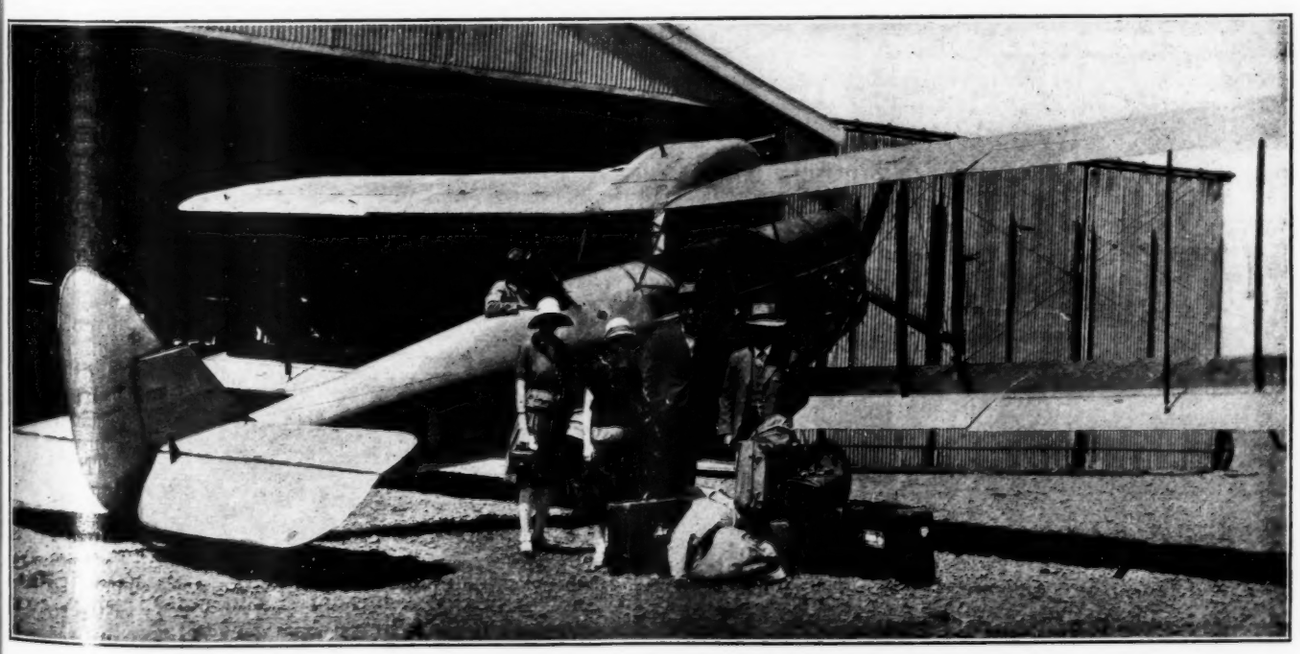
Great difficulty was experienced in getting suitable machines for the service. Two modern commercial airplanes were ordered, but these proved a failure in their tests and the company was left without machines with which to commence the service.

The directors faced the situation by starting a provisional service maintained by three Armstrong-Whitford planes and one DeHavilland 4 machine, and, at the same time, urgently ordering from England two commercial machines of a suitable and proved type.

This provisional service commenced on Nov. 2, 1922, and managed to keep the weekly schedule in operation at a high degree of efficiency for the first year, at the end of which time two DeHavilland 9c machines were placed on the route.

Running over the first year had proved that, when operating with obsolete equipment, a high degree of safety and efficiency could be maintained. The old machines were, however, slow and uncomfortable for passengers. The almost open engine exhausts made the passengers' compartment very noisy as well as windy, and passengers were almost frozen in Winter and roasted in Summer.

The new machine, however, soon made a wonderful difference to the passenger traffic and their excellent running, com-



Air Mail and Passengers with luggage on arrival at Longreach from Charleville

fort and freedom from excessive noise and wind made them very popular with passengers and made air travel not only the most speedy but the most comfortable mode of travel in that region.

The two DeHavilland 9c machines carried on the service with success, and, in October last, the latest commercial DeHavilland 50 four-passenger machine was placed on the route in order to meet the heavy demand for seating accommodation between Longreach and Charleville. This machine has given complete satisfaction and carries four passengers and luggage at the same running cost as the DH 9c machines, which carry three and the original machines which carry only two passengers.

The company's fleet now consists of one DeHavilland 50 four-passenger machine; two DeHavilland 9c three-passenger machines; 1 Bristol Fighter two-passenger machine; 1 DeHavilland 4 two-passenger machine; 1 B.E.2e one-passenger machine and one Avro, two-passenger machine.

Headquarters

Longreach is the headquarters of the company and the central airdrome is situated 1½ miles from the town. The hangar, which will house six machines, is a fine tubular steel and iron building 113 ft. long, with a 60 ft. span. The floor is of concrete and wings have been built on to each side and rear of the building to contain the storeroom and engine and machine repair departments. Smaller buildings are situated at the southern terminal, Charleville, and at Cloncurry, capable of housing three machines each.

The staff is as follows:

Hudson Fysh, managing director; W. A. Baird, airdrome manager; R. D. Miller, secretary. The flying staff of the Qantas is as follows: pilots: Hudson Fysh, P. H. Moody, L. J. Brain, A. N. Evans. Airdrome staff: 5 enginemen and riggers; 2 woodworker carpenters and 3 improvers.

Mileage Statistics

The company's machines, until Jan. 31, 1926, had flown a distance of 322,123 miles, this record mileage being attained without any injury to staff or clients of the company. The record follows:

	1st year contract	2nd year contract	3rd year contract
Mail route passengers	156	283	486
Taxi	22	96	160
Joy ride	30	234	260
	208	613	906
Parcels, number	82	345	639
Weight	264½ lb.	1,597 lb.	4,684 lb.
Letters	12,895	11,689	17,496
Scheduled trips completed....	99.51%	100%	100%

The above comparison of operations will show how the passenger traffic is steadily growing as people have more confidence in air travel and realize the advantages which can be gained by the saving of their time.

Advantages of Air Travel

Some of the savings in time effected by passengers, freight and letters conveyed over the air route are remarkable, and, in almost every case, reach at least 24 hr. A passenger, for instance, traveling from Charleville to Longreach, does the journey by rail in 5½ days at a cost of £11:10:0 (roughly $55.). By air, this same trip is accomplished in 4 hr. at a cost of £8:10:0, (roughly $40.). A passenger between Longreach and Cloncurry, by car and rail, does the trip in 3 days at a cost of just over £7. The air traveler does the journey in 4½ hr. at a cost of £10 (roughly $50.). Two days are saved by the traveler by air between Cloncurry and the southern cities, and the saving in time between the Camooweal districts and Sydney is 7 days. This great saving in time from the far West is expected to have some bearing on opening the sparsely populated Barcly Tablelands, as business men are now able to make a visit and return to their city offices within a reasonable time and without fear of being held up through road conditions.

Aerial Mapping in Alberta

One of the outstanding features of aerial photography is its wide field of application as an aid in the development of the natural resources of the country. This is indicated by the progress made in Alberta, Canada, during the past year. In this province, using only one airplane, over 8,600 square miles of territory were successfully photographed. The work was carried out from the High River air base by the Topographical Survey, Canadian Department of the Interior, in cooperation with the Royal Canadian Air Force, and consisted principally in obtaining vertical overlapping photographs from an elevation of slightly over two miles.

The major portion of the work done was in connection with land classification, forest investigation, and mapping surveys in the district between Edmonton and Athabaska covered by the Victoria sheet of the Sectional Map of Canada, and that covered by the Fort Assinboine sheet to the West. The previous season's experiments showed that, with the photographs available, the mapping work was so facilitated that the examiners could confine their attention almost entirely to the examination and interpretation of the soils and surface cover, thus greatly expediting the work, at the same time obtaining more reliable results.

Photos Mounted for Use

The photographs showed in great detail all the features of the ground, the exact areas and boundaries of bush lands, swamps, sandy areas, the courses of rivers and streams with their innumerable windings and the roads and other features of importance. These photographs were mounted and assembled in book form for each township and on them were marked the boundaries of each quarter-section, or farm unit. The books were taken right into the field and the examiners made their notes on the photographs in proper position from ground study.

The party, without the use of the photographs in previous years, was able to examine and map on the average 600,000 acres each season. With the aid of the airplane photographs, this party completed 1,178,000 acres, or an increase of 96 per cent. Not only were the results more complete and more detailed, but the photographs are still available for rendering similar service to the geologist, forester and others interested in the development of the district.

Assisting in Coal Prospecting

Another operation of considerable importance was the photographing of the Saskatchewan River valley and adjacent country from west of Edmonton upstream to its junction with the Clearwater river. These photographs were required for the purpose of studying and correlating the coal seams of the district and making other geological investigations. The great assistance rendered to the geologist by these photographs has been reported by Dr. Allan of the University of Alberta under whose direction the investigations were being carried out.

The other work done in this province consisted principally of photographing the Buffalo Park at Wainwright. The purpose was to obtain at small expense and without undue expenditure of time, a map of the park for administrative purposes.

The success of these operations carried out in conjunction with the ground investigations gives promise of great assistance to geologists, examiners, foresters, and others connected with the development of the resources in enabling them to concentrate their energies on the investigations in hand, having at the same time a detailed and comprehensive view of the whole area under consideration. The elimination of the mapping, leaving only the interpretation and study, should greatly expedite the investigations.

An extremely interesting and significant feature in connection with the above work is the fact that the officers of the Air Force were successful in photographing the entire district in parallel strips ninety miles long with very few gaps and no waste overlapping. This was done over territory, a large portion of which is in forest reserves hitherto unmapped.

Miami–Jacksonville Air Mail Opened

Large Quantities of Air Mail Characterize Opening. Extension of Present Florida Mail Route to Atlanta to be in Operation by June 1.

ON APRIL 1, the Florida Airways, which is headed by Maj. Reed M. Chambers, started operations on their route from Miami to Jacksonville, Fla., via Fort Myers and Tampa. On the first day 24,000 pieces of mail were carried, netting $1,900. Since that time the volume has been fairly heavy from Miami to northern points, with good indications of a steady increase from the northern States into Florida as soon as the publicity mediums get established and the public realizes the value of the line. On June 1, the line will be extended from Jacksonville to Atlanta, Ga., and is expected to greatly increase the amount of business. The line will carry passengers and express in addition to air mail.

Between Miami, Fort Myers and Tampa the Florida Airways Corp. is using the Ford Stout all-metal monoplanes. On the Tampa-Jacksonville run the company has a fleet of Curtiss Larks with Wright Whirlwind engines and also Travel Airs with OXX6 engines.

The Florida Airways has a very fine fleet of mail planes. Conditions in Florida are excellent from the flying point of view as rail transport is very congested and slow at its best, while air conditions are very favorable as there is no fog and few bad storms.

P & A Photos

Mayor Perry T. Wall loading the first bag of mail on to the Florida Airways mail plane for Jacksonville. Left to right: L. P. Dickie, Manager of the Board of Trade; City Commissioner W. A. Adams; Mrs. Elizabeth Barnard, Post Mistress and Mayor Perry T. Wall of Miami. The airplane is a Curtiss Lark equipped with a Wright Whirlwind engine.

Australia Reports Progress in Civil Aviation

Very satisfactory progress has been made in civil aviation since the inception of passenger and mail transportation in Australia.

The first important service was established between Perth and Derby, Western Australia on Dec. 5, 1921, by the West Australian Airways, Ltd. Since that time 3,196 machine flights have covered 494,670 passenger miles in 7,240 hr. of actual flying. In the past four years, 2,729 passengers have been carried over single stages, while 630,000 letters and 27,027 lb. of freight were handled. In 1925, 1,056 passengers, 236,500 letters, and 12,809 lb. of freight were carried.

The Queensland and Northern Territory Airway Service, since its opening on Nov. 2, 1922, has made 2,207 flights, traveled 215,901 machine miles, carried 2,251 passengers, 46,000 letters and 22,499 lb. of freight over single stages. In 1925, 1,142 passengers were carried, and 19,000 letters and 13,154 lb. of freight were transported over single stages.

The Larkin Aircraft Supply Co., Ltd., also operates a passenger service which was opened June 2, 1924, operating between Adelaide and Cootamundra. Two additional routes, from Melbourne to Hay and from Melbourne to Broken Hill, were opened late. These services were substituted for the first on July 21, 1925. On the first route from June 2, 1924 to July 19, 1925, 118 passengers and 3,870 letters were carried; on the second, from July 21 to December 31, 1925, 196 passengers and 5,000 letters were transported. Freight has also been carried but figures for that traffic are not available.

The Field of Aeronautical Engineering

The Diversification of Aeronautical Engineering. An Outline of the Subdivisions. Military vs. Commercial Requirements.

By ARCHIBALD BLACK
Consulting Air Transport Engineer

THERE WAS a time, and not so many years ago, when the field of aeronautical engineering covered a very limited range of activities. With the constant extension of the aeronautical industry, the creation of new uses for aircraft, the development of new aircraft equipment and concentration of attention on what might be termed side problems, the field of the aeronautical engineer is gradually broadening. Where this will stop, we cannot even guess, but a review of the conditions as they exist will show that the well rounded aeronautical engineer must possess knowledge and experience of an amazingly diversified type. It is clear that we are heading toward specialization, for no human brain is quite capable of grasping every detail of the seemingly endless ramifications of present day aeronautical engineering. No doubt the near future will see a class of aeronautical engineers, each having his own little specialty and having only a general and rather incidental knowledge of all of the other branches. For example, we may expect to witness shortly the appearance of the propeller designer, the structural design engineer, the performance design engineer, the airway and landing field engineer, the wind tunnel engineer and a list of others whose work is confined to the narrower limits of some specialized field.

The Natural Course of Events

This is only the natural and logical course of events and we seem to be headed that way, whether we like it or not. Indeed, in some large organizations, such specialists have already come into existence. Of course, it stands to reason that the specialist in each division will find it necessary to acquire some general knowledge of other divisions with which he comes into contact. But, at the same time, his specialization will be such that, if at all conscientious, he would hesitate to take up personally problems in other divisions than his own. In the existing specialization, to which reference has been made, one engineer is assigned to some particular activity, but this is not usually carried to such an extent that it becomes impracticable to shift him quite readily from one class of work to another. The specialization of the future, as it may be visualized, will discourage, if not prevent, such shifting. If some engineer questions this, let him tackle some problem in a branch of the industry which has not engaged his attention for some time past. Perhaps he has not been brought into close contact with wind tunnel work for a few years, or perhaps it may be stress analysis. Turning out of his routine work to this other division, he will be surprised to find how he flounders around, groping for solutions that are apparent to the specialist in each of these fields.

The Dividing Lines Appear

The most immediate and probably the sharpest dividing line is likely to be that drawn between military and commercial activities. While it is true that we have a sharp line, today, between aerostation and aviation this military-commercial dividing line is likely to be more pronounced. The military designer, today, is frequently seen floundering around when he attempts to enter the commercial field. Of course, he does not know that he is floundering, but this is perfectly clear to those engineers familiar with commercial requirements. Our first commercial airplane designers and operators came from the military side. This was quite logical as they had to come from some other field in the beginning. It would have been just as logical for them to have come (as many actually did) from some field entirely foreign to aviation. Some of the most practical operators of airplanes today were running motor buses or railroad trains before they started running airplanes. In future we may witness the advent of designers of commercial airplanes who were designing motor buses or railroad cars before they entered the air transport field. For it must be realized that this whole air transport business is primarily transportation. The airplanes are little more than incidental and it is just as important to know how to reduce manufacturing and operating cost as it is to know aerodynamics. Indeed, one might say that the only need for knowledge of aerodynamics is because of its effect upon safety, reliability and operating cost.

Outlining the Subdivisions

As a matter of fact, air transport could get along fairly well with very poor application of aerodynamics but it would not get very far if operating cost were neglected. Just at present, this question of operating cost is actually of secondary importance to the problem of getting traffic. However, reference is made above to a condition which we will reach as soon as the traffic problem has been started on the way to solution.

Taking military and commercial aeronautics together for the time being, the engineering in these fields may be divided into the following five classes:

1. Research; 2. Design; 3. Construction; 4. Operation; 5. Maintenance. This is also about the order of progress in which activities move along the line. That is to say, work on any development begins with research, proceeds then to design, construction and operation, becoming finally a maintenance problem.

Under each of the heads there is usually a very marked distinction between military and commercial activities. Following down the lines of subdivision of aeronautical engineering we may prepare a list such as the appended table, in which the subdivisions of the major heads are given. In this table, no attempt has been made to compile lists under the two heads of military and commercial but a list has been given as it might be applied to commercial activities.

Commercial vs. Military Requirements

The list, as it might be compiled for military activities, would be somewhat similar, certain items being dropped while others were substituted. However, this does not mean that the work listed under the remaining heads would be the same for military as for commercial activities. Very much to the contrary, almost every item appearing in each list would be found to require a special military or commercial aspect, as the case might be. For example, we may take the items affecting materials which would, apparently, be the same under either head. Yet here we note that commercial operations require materials which have a low ultimate cost (the initial cost plus the maintenance less the salvage). This will be the primary requirement for civil operations but it is of little or no importance in military work. Instead such elements as strength and weight, or perhaps some special requirement such as bullet-proof properties, may outrank any others. Of course, there will be many cases where the divergent requirements are not such as to necessitate specialized training of personnel, but these will eventually become exceptions rather than otherwise.

Engineering Societies and Aeronautics

At this time aeronautical engineering engages a small part of the interest of each of two of the National engineering societies in the United States while some others come into slight contact with it. We have no national body devoting itself exclusively to aeronautical engineering, as does the Royal Aeronautical Society and the Institution of Aeronautical Engineers in England. While the American arrange-

ment may appear somewhat like a makeshift, it serves its purpose quite well. For the present, at least, the limited activities in aeronautics fully justify this method of leaning upon the established societies. Whether or not modification of this policy may become desirable at a later date is something which only the future can determine.

DIVISIONS OF ENGINEERING IN THE FIELD OF COMMERCIAL AERONAUTICS

1. RESEARCH	2. DESIGN	3. CONSTRUCTION.
Wind tunnel.	Propellers.	Propellers.
Full scale testing.	Engines.	Engines.
Metallic materials.	Airplanes.	Airplanes.
Woods and glues.	Helicopters.	Helicopters.
Fabric.	Airships, rigid.	Airships, rigid.
Petroleum.	Airships, semi-rigid.	Airships, semi-rigid.
Finishing materials.	Airships, non-rigid.	Airships, non-rigid.
Traffic analyses.	Balloons.	Balloons.
Engines.	Buildings.	Buildings.
	Landing fields.	Landing fields.
	Airship mooring.	Airship mooring.
	Landing field equipment.	Landing field equipment.
	Engine equipment.	Engine equipment.
	Airplane equipment.	Airplane equipment.
	Airship equipment.	Airship equipment.
	Airways.	Airways.
	Airway equipment.	Airway equipment.
	Repair shops.	Roads and runways.
		Equipment of shops.

4. OPERATION	5. MAINTENANCE.
Airplanes, transport.	Airplanes.
Airplanes, surveying.	Engines.
Airplanes, photographic.	Airships, rigid.
Airplanes, advertising.	Airships, semi-rigid.
Airplanes, insecticide dusting.	Airships, non-rigid.
Airplanes, air taxis.	Landing fields.
Airships, transport.	Buildings.
Radio.	Fire protection.
Landing fields.	Motor transport.
Airways.	Airways.
Meteorology.	Airway lighting and direction-finding equipment.
Traffic.	Roads and runways.
	Repair shops.

A Good Whirlwind Performance

On its initial cross-country run from the Mexican border to the Canadian border on the Pacific coast, the Ryan M-1 monoplane, powered with a Wright Whirlwind 200 hp. air-cooled engine, reduced the flying time record between San Francisco and Seattle by 27 min. and cut down the government's required flying time in every instance by one-third.

The entire distance of 2,624 miles was covered at an average of 114.08 m.p.h. with the engine turning at 1500 r.p.m.

The mileage on the trip was taken as approximately the airline and did not include deviations from the airline due to the contour of the country and the winding course followed at times. An ordinary wood propeller was used and not one designed especially for this plane. The 126 mile flight from the Ryan Airline field at San Diego to their terminal on Meas Drive in Los Angeles was made in just 62 min. flying, the plane carrying two passengers, with 200 lb. of express and baggage. The Pacific Air Transport is using ten of these planes for the Los Angeles-Seattle air mail service. This route is the longest private air mail line in America and proved a worthy test for the Ryan M-1 and the Wright Whirlwind. The individual flying times on this flight were as follows:

North:

Trip	*Miles*	*m.p.h.*	*Time*
San Diego-Los Angeles	126	120	1 hr. 03 min.
Los Angeles-San Francisco	357	107.1	3 hr. 20 min.
San Francisco-Seattle	829	117.8	7 hr. 02 min.
	1,312	114.89	11 hr. 25 min.
South:			
Seattle-San Francisco	829	124.3	6 hr. 40 min.
San Francisco-Los Angeles	357	95.2	3 hr. 45 min.
Los Angeles-San Diego	126	108	1 hr. 10 min.
	1,312	113.26	11 hr. 35 min.

Total trip San Diego-Seattle and return:—
2,624 miles in 23 hr. at 114.08 m.p.h.
Approximate pay load entire trip 530 lb.

Underwood & Underwood

The Norge flying over typical English countryside on its way to the Pulham airship station

The Pander Type E Sportplane

An Interesting Two-Place Sportplane with a Radial Engine and Good Flying Qualities.

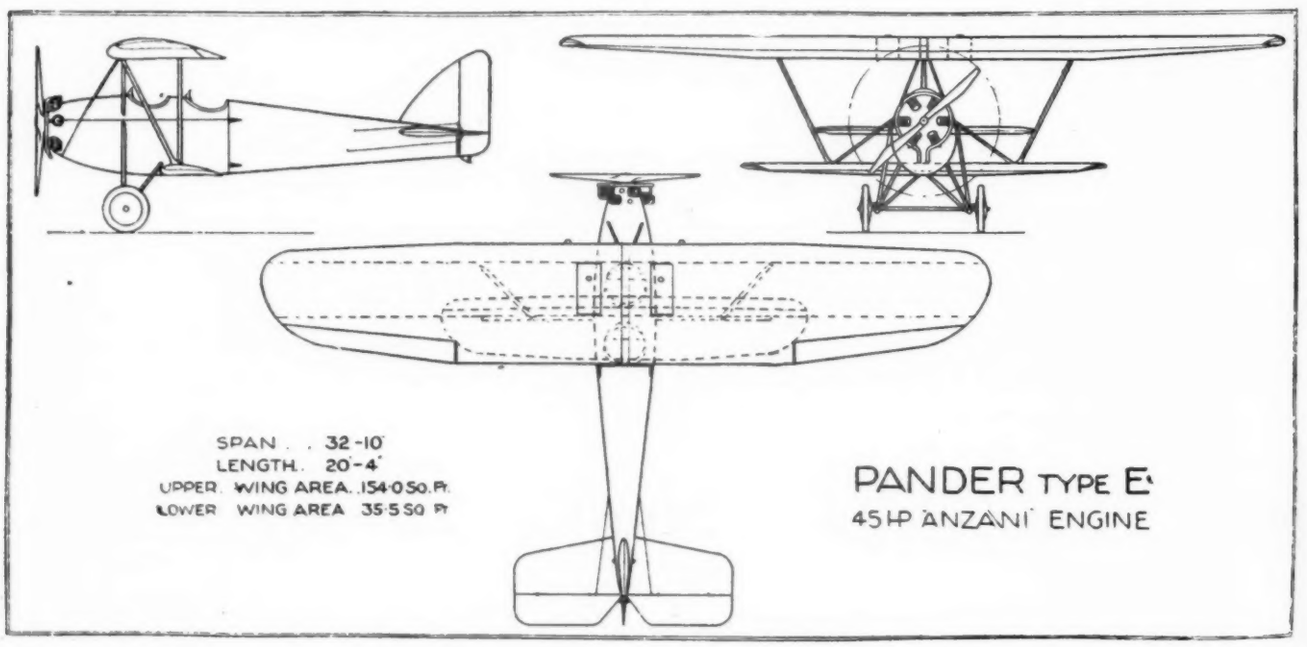
THE PANDER Type E biplane is a small two-place machine built in Holland by the manufacturers of the somewhat well known 25 hp. Pander lightplane.

The plane is, in general, of wood construction, the upper wing being a semi-cantilever thick section structure with a span of 33 ft. and a chord of 3 ft. 3½ in. The wing section is constant between the single V struts with a maximum thickness of 12 in. From the struts to the wing tips, the wing tapers in chord and thickness, making the depth of the tip section only 4 in. This wing is formed of two box construction beams of spruce and plywood structure. The wing ribs are also constructed of plywood with poplar stiffening strips.

As in normal practice, the wing covering is fabric, with the exception of the center section which is completely covered with plywood, as is also the entire leading edge of the wing. The lower wing, which is streamline in the lower part of the fuselage is a comparatively small structure with a span of but 16 ft. 6 in. and a chord of 2 ft. 9½ in. It is entirely constructed around a single main spar of box section, having a width of 8 in. and a thickness of 5¼ in. This wing is braced to the upper wing by means of outward sloping V struts of streamline steel tube and also similar V struts extending to the upper longeron to the fuselage on each side.

The tail plane of the Pander Type E is built in a similar manner to the wings incorporating the use of plywood to a

The Pander Type E two-place plane



General arrangement drawings of the Pander Type E

His Best Friend

The flyer's best friend is his motor. Every time he takes off for a flight, he must trust his life to its power and reliability.

But the motor is an exacting friend. It demands painstaking attention and care. Above all else, it demands the best of fuel and oil.

Stanolind Aviation Gasoline and Aero Oils

were developed expressly to meet the exacting requirements of the aeroplane engine. These products enable the motor to deliver its maximum power, even under the most adverse conditions.

Stanolind Aviation Gasoline and Aero Oils are obtainable at most landing fields throughout the Middle West. Send for a free copy of our "Aviation Manual," which contains a map showing the location of these fields.

Standard Oil Company
(INDIANA)
910 S. Michigan Avenue
Chicago

A smart row of Pander lightplanes

large extent and is braced on the under surface to the fuselage by single streamline steel tubes. In the case of the rudder, welded steel tube construction is employed, with sheet steel ribs. The rudder, with the tail skid attached to it, operates in bronze hinges. The shock absorbing qualities of the tail skid are obtained by means of a spiral steel spring.

Turning to the fuselage, this has an oval section and is constructed in very much the same manner as that of the Pander light plane. The structure consists of four spruce longerons and a plywood covering. This structure applies only to the after part of the fuselage, behind the rear cockpit. The forward part is of welded steel tube with thin aluminum sheet covering. Two cockpits are provided with dual control, the rear cockpit being for the pilot.

The Power Plant

The engine is a 45 hp. Anzani 6 cylinder radial air-cooled engine provided with a special starting magento. The engine mounting is extremely simple and designed with the possibility in mind of a more powerful radial air-cooled power plant being substituted for the Anzani. Two gasoline tanks are located in the center section of the wing, with a capacity of 6½ gal. giving, it is claimed, a radius of 300 miles to the machine. Lubrication is supplied to the engine from a special tank located between the forward cockpit and the engine itself, supply being through flexible copper tubing, as is also that from the fuel tanks.

As will be seen from the accompanying photograph, the under carriage is of conventional design and, in general, the entire plane is without very outstanding features, with the exception of the very large upper wing in comparison to the span of the lower wing. It is interesting to note that Valspar is employed very extensively in the finishing of this plane and, in fact this very excellent varnish is used almost exclusively by H. Pander and Sons.

Characteristics

The general details are contained in the following table:

Span	33 ft.
Height	8 ft. 7 in.
Length	20 ft.
Area of upper wing	144 sq. ft.
Area of ailerons	10.7 sq. ft.
Area of lower wing	35.5 sq. ft.
Total area of wings	190.2 sq. ft.
Area of tailplane	20. sq. ft.
Area of elevators	10.7 sq. ft.
Area of fin	5.9 sq. ft.
Area of rudder	6.0 sq. ft.
Weight empty	702 lb.
Total weight with 4 hours full	1180 lb.
Maximum speed	78 m.p.h.
Minimum speed	38.5 m.p.h.
Climb to 3000 ft.	7¾ min.
Ceiling	11,500 ft.
Loading per sq. ft.	6.2 lb.
Loading per hp.	26 lb.
Engine	Anzani
Normal hp.	45
Maximal hp.	50
Revs., at normal hp.	1500 r.p.m.
Revs., at maximum hp.	1580 r.p.m.

Supercharger Tests

A report, published by the National Advisory Committee for Aeronautics and entitled, "Description and Laboratory Tests of a Roots Type Aircraft Engine Supercharger" by Marsden Ware, has just been issued.

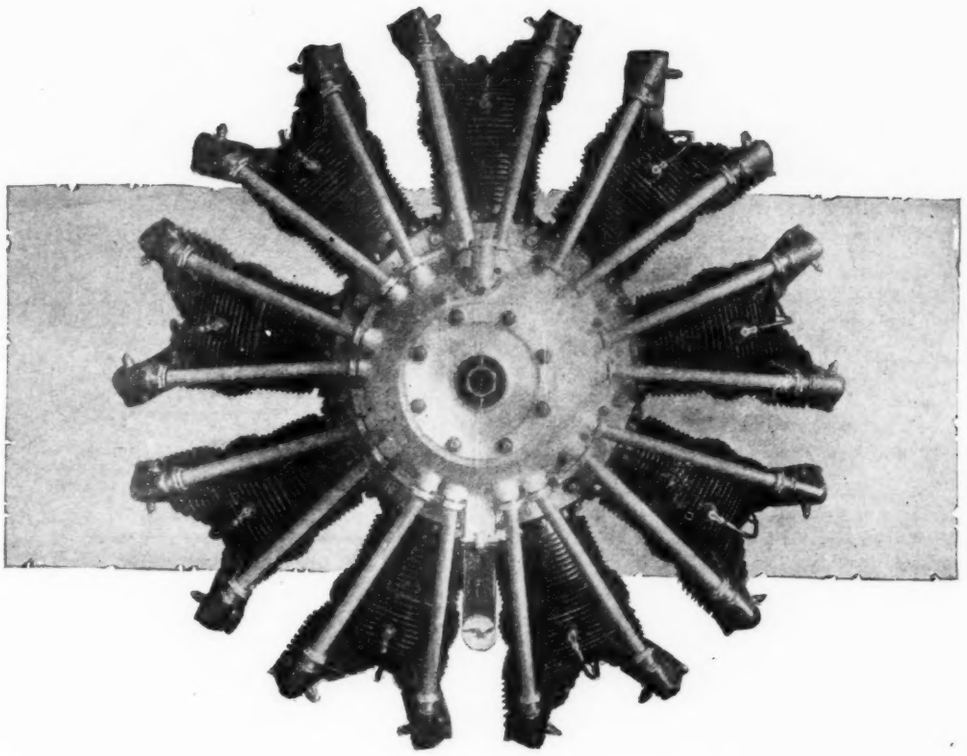
This report describes a Roots type aircraft engine supercharger and presents the results of some tests made with it at the Langley Field laboratories of the National Advisory Committee for Aeronautics. The supercharger used in these tests was constructed largely of aluminum, weighed 88 lb., and was arranged to be operated from the rear of a standard aircraft engine at a speed of 1½ engine crankshaft speed. The rotors of the supercharger were cycloidal in form and were 11 in. long and 9½ in. in diameter. The displacement of the supercharger was 0.51 cu. ft. of air per revolution of the rotors.

The supercharger was tested in the laboratory, independently and in combination with a Liberty-12 engine, under simulated altitude pressure conditions in order to obtain information on its operation and performance. During an investigation of the influence on the operation of the engine of various types of air-duct connections between the supercharger and the engine, the supercharger was subjected to considerable rough treatment, which it endured very well, so that it seems apparent that the supercharger could well endure service handling. By the proper proportioning of the air-duct system, the engine would operate at all speeds as smoothly and free from vibration as the normal engine.

From these tests it seems evident that the Roots blower compares favorably with other compressor types used as aircraft engine superchargers and that it has several features that make it particularly attractive for such use.

A copy of the report, No. 230, may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

THE "WASP"



The "Wasp" marks a turning point in engine types for "fighting" planes. For the first time the dry weight of an air cooled engine compares favorably with that of the most efficient water cooled types. Its installed weight per horsepower is considerably less.

THE
PRATT & WHITNEY AIRCRAFT CO
HARTFORD CONNECTICUT

PRATT & WHITNEY, U.S.A. DEPENDABLE ENGINES

LANDING FACILITIES MUNICIPAL FIELD AND CONNECTICUT RIVER ON AIRWAYS MAPS

When Writing to Advertisers, Please Mention AVIATION

Radio in the Spain-Argentina Flight

For the following discourse on the employment of radio in the Spain-Argentina flight carried out by Comdr. Ramon Franco and Capt. Ruis de Alda of the Spanish Air Service in a Dornier Wal seaplane recently, AVIATION *is indebted to its British contemporary,* Flight.—EDITOR.

Radio apparatus now forms a very important part of the equipment of aircraft used for combatant services or for commercial purposes, and not the least of the many factors contributing to the successful trans-Atlantic flight of Comdr. Ramon Franco, the Spanish pilot who recently flew from Spain to Argentina, was the use of the radio apparatus installed on the Dornier Wal seaplane.

The Dornier Wal seaplane is mainly constructed of metal, and was equipped with a Marconi standard type A.D.6 telegraph-telephone set and a Marconi direction-finding (D.F.) set.

The metal construction of this machine, while assisting considerably in the reduction of magneto disturbances, adversely affects the receptive power of Bellini-Tosi, or any other loop aerial. In the usual wood and canvas construction, no difficulty is presented in installing in airplanes efficient loop aerials. In all-metal machines it is, however, necessary to arrange the D. F. loops as far as possible from closed conducting paths. The limiting factor for reception, of the Bellini-Tosi aerial, is controlled by the area turns of the fore and aft loops, which should be as great as possible. The area turns, however, are limited by the fact that the loops and supports must be able to withstand considerable wind pressures, vibration and shocks, and the difficulty of designing a multi-turn loop supported clear of all masses of metal increases disproportionately with the number of turns. To meet these conditions, therefore, a special type of loop aerial was fitted on the Plus Ultra, and the Marconi standard aircraft D. F. receiver was altered to increase the working range of the equipment.

The Antennae

The fore and aft loops consisted of two single-turn loops supported on struts and arranged symmetrically on each side of the hull, great care being taken to avoid any out-of-balance effects due to the presence of large masses of metal. The two loops were connected in series, and the total area turns approximately 250 sq. ft. In order to obtain equal reception with the wing coil, a single turn loop was mounted in the plane of the wing. The two sketches show the positions of the two fore and aft loops and the wing loop. The terminal ends of the loops were connected by a length of cable leading to the navigator's position near the pilot.

To increase the working range of the direction finder and to compensate for the smaller receptive power of the loops, it was found necessary to increase the overall magnification of the standard aircraft direction finder receiver. This was accomplished by the use of a 12-tube amplifier divided into two units, the first unit containing six stages of high-frequency magnification, a detector tube, and a note-magnifying tube. Ten Marconi standard type D.E.V. tubes and two standard type D.E.Q. tubes, taking a total filament current of 2-4 amperes at 3 volts, were used. The anode voltage for the receiver was supplied by a 96-volt dry cell battery, and the filaments were run off an accumulator battery.

The radiogoniometer and high-frequency tuning unit were of the standard type supplied with aircraft equipments, and cover a wave-range of 61,000 metres.

The equipment was calibrated on wave-lengths of 600 and 900 metres, and the quadrantal error curves were well within the limits required for navigational purposes.

Results With D.F. Apparatus

Reports from Captain Ruis de Alda, the navigator who took the D.F. bearings during the flight, show that bearings were obtained at a distance of 700 kms. (434 miles) from Las Palmas, and such was the accuracy of the readings that the course was directed solely by the aid of the direction finder during this stage of the flight. When nearing Las Palmas visibility was very poor, but the signals from the shore stations enabled the navigator to maintain a direct course to his destination. The reader will, no doubt, be interested in the following extracts of a letter sent by the navigator, Capt. J. Ruis de Alda, from Las Palmas to the Chief Engineer of La Compania Nacional de Telegrafia sin Hilos, Spain:—

January 25, 1926.

"At 50 kms. from the Spanish coast began the clouds which were at 200 m. over sea, and extended to Canary Islands. Therefore, in the case of flying below the clouds layer, we would not be able to do astronomics observations, and over the layer we would not see our deviations produced by the wind.

"Since the first bearing obtained, which gave Las Palmas at 7° starboard until the end of the flight, its work was mathematic; it was giving us the difference in angles of Las Palmas and Teneriffe. Briefly, since 11 a.m. we were directed solely by the D.F. I marked on the chart obtaining them by the intersection of the two bearings, several points, and none was separated more than 5 miles from the ideal route.

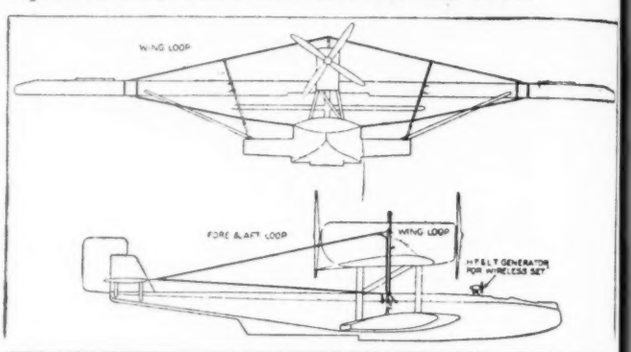


Diagram of the radio direction finding aerial on the Dornier Wal

"As we were approaching we heard all steamers in the vicinity of the islands, and all of them gave me a unique bearing as a whole, as the steamers were scattered around the islands. At 3 p.m. we perceived indistinctly a very far island on the port side, and Franco decided to make for it. I told him that the island in question was Lanzarote, and as he apparently was not convinced, I gave him the bearings obtained with the D.F., and they were giving mathematically the degrees we separated from our route. Then Franco, convinced, returned to the route, and we continued without seeing land until after 10 kms., when we saw close to us an island. We passed through a glade and the Puerto de la Luz (Las Palmas) was at sight. We landed, and remain here on account of the heavy sea, which does not allow us to leave, although I hope we shall proceed the flight to-morrow."

The Communication Radio Equipment

As regards the telegraph-telephone equipment, the standard type A.D.6 set was used for the transmission and reception of ordinary service messages. The essential components of both transmitter and receiver are mounted in one unit. The transmitting system comprises an aerial tuning inductance, an oscillation tube, control tube, and a sub-control tube. The receiving system comprises an aerial tuning inductance and a five-tube amplifying detector.

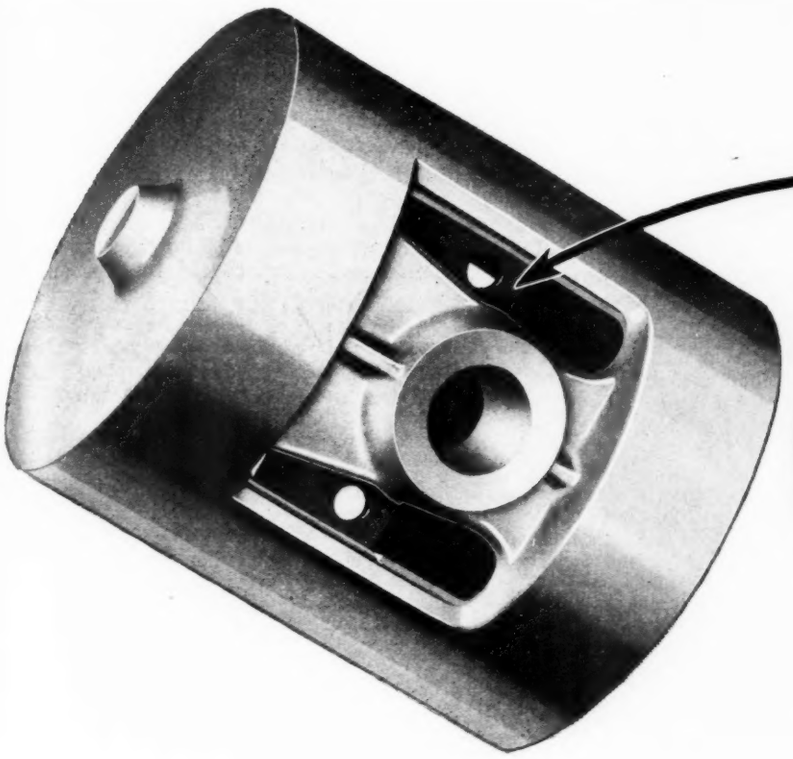
The tubes used on the transmitter are two Marconi standard type M.T.3F and one M.T.5 with a total filament current of 6.6 amperes at 6 volts. The receiving valves are two type V.24 and three type QX, with a total filament current of 3.75 amperes at 5 volts.

The wave-range of the transmitter and receiver is continuously variable between 400 and 1,200 m.

The system of remote control by means of Bowden cable enabled the operator to change over the send-receive switch, or to effect small adjustments in the tuning of the circuits.

A dual control equipment, comprising two microphones, two pairs of headphones, and two coupling units, enabled either the pilot or navigator to use the wireless set or to converse with each other.

Power for the anode circuits of the tubes and for the filament lighting batteries was supplied by a wind-driven generator developing 100 milliamps. at 1,500 volts and 6 amperes at 7 volts. A trailing aerial approximately 200 ft. long was used for the set.



The *Strut*

Expansion in Nelson BOHNALITE Pistons is controlled by steel struts—to set pistons as close as .0015", it is of course necessary to use a steel with an unusually low coefficient of expansion.

Pistons fit to .0015"

Nelson BOHNALITE Pistons can be fitted as close as .0015" —a fitting made possible by the use of steel struts which control the piston expansion.

The struts are cast a part of the BOHNALITE, providing a piston of the weight and heat conductivity of aluminum with a coefficient of expansion as low as steel.

BOHN Products include Ring True Bearings — BOHNALITE Castings, both permanent mold and sand — Nelson BOHNALITE Pistons.

BOHN ALUMINUM & BRASS CORPORATION

EAST GRAND BOULEVARD, DETROIT

When Writing to Advertisers, Please Mention AVIATION

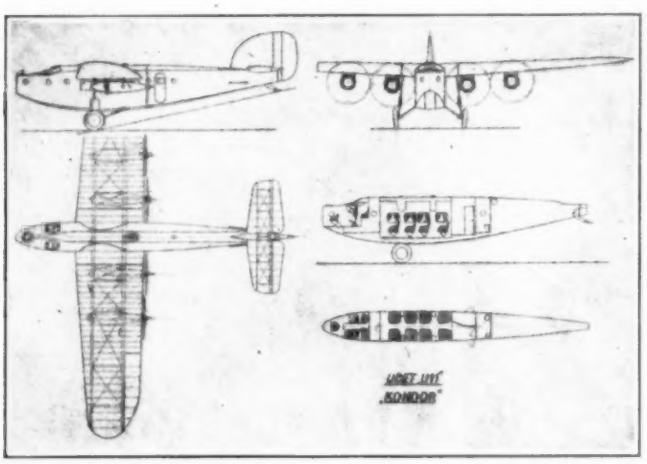
The Udet Kondor Airliner

A New German Monoplane Airliner Incorporating Novel Engine Arrangements.

HERR UDET, one of Germany's aces, opened up an airplane factory near Munich, Germany, shortly after the Armistice. Due to the limitations imposed on Germany by the Versailles Treaty, the first ten planes which his factory designed and built were of small size. The best known are a two-seater sport plane of the low wing type and a parasol monoplane.

Now that many of the treaty limitations have been lifted, Herr Udet has brought out an interesting four-engine eight passenger plane which he calls the Condor. The plane is built entirely of metal and the four engines are hung under the single internally braced wing. The engines are of 100 hp. each and of the air-cooled type. They drive pusher propellers through a shaft extending to the rear of the trailing edge. This arrangement probably gives an excellent air flow over the wing but the long shafts add complication and weight.

The four small engines, the outer pair of which are well out on the wings, must subject the wing to considerable stresses on landing, and in the air the lack of concentration



A diagram of the general arrangement details of the Udet Kondor

of weight must make the machine somewhat heavy in control. Also, it can be brought out that a four-engine plane is less reliable than a three-engine plane unless it can fly on any two engines. In spite of all these possible difficulties, the plane is original in design and worthy of study. Its trial flights were successful but no real performance figures are available and it will be some time before its practical value is ascertained.

The Condor has a thick tapered cantilever wing with a span of 62 ft. 1 in. The wing is made in three pieces, a center section which fastens to the top of the fuselage and only

The engine arrangement in the Udet Kondor

extends out a few feet on either side and the two wing extensions which are bolted onto the center section. The wing tapers both in thickness and in plan form, the rounding off of the wing tips being especially noticeable. The wing section is the Prandtl No. 449.

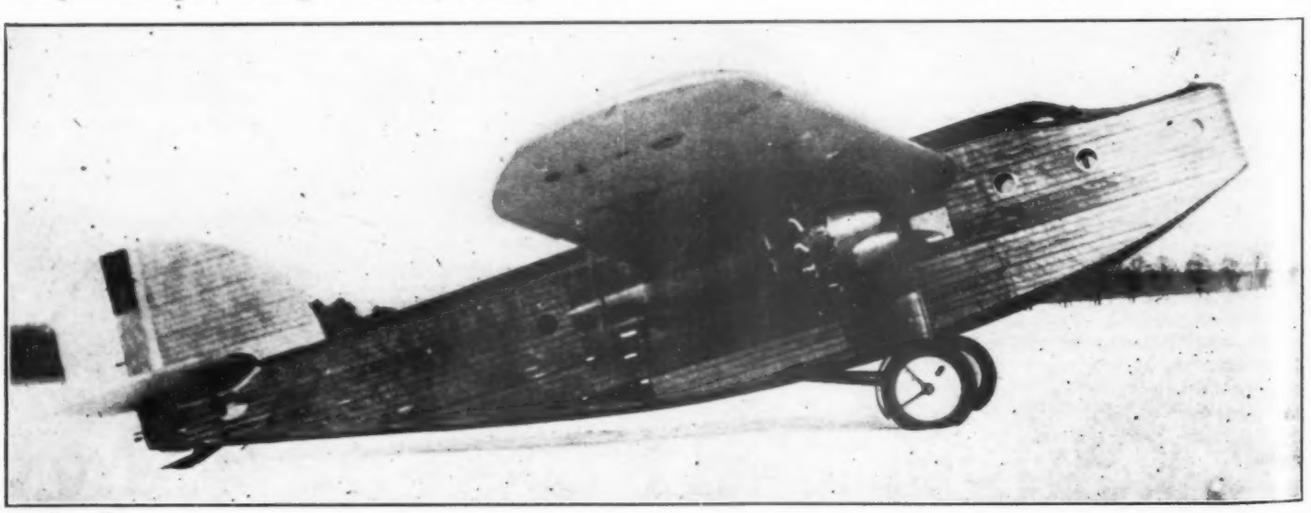
The wing is entirely built of metal. The beams are of box structure with the usual spreaders and cross wires. The ribs are rather close together, especially near the center section and the wing is covered with flat metal sheeting.

The fuselage extends somewhat far out beyond the wing in front and the pilot sits in the very nose, while there are seats for two navigators on either side and to the rear of his seat. The passengers cabin is very spacious and has seats for eight persons. There is also a baggage compartment and a toilet provided.

The tail surfaces are exceptionally large and unbalanced, the vertical stabilizer being adjustable.

The Udet 11 is fitted with four radial air-cooled Siemens

Continued on Page 676



(c) Photo Press

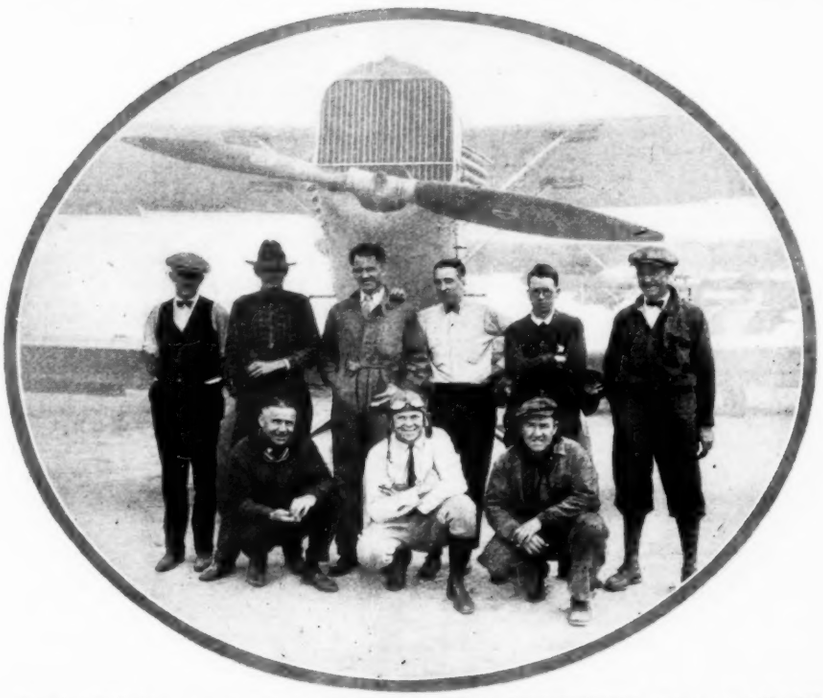
The Udet Kondor airliner. Note the two radial engines mounted under the wing.

STANDARD STEEL

ADJUSTABLE PITCH -- ALL METAL

PROPELLERS

Are Now in Commercial Service



Douglas Mail Planes equipped with STANDARD STEEL PROPELLERS and some of the Field Staff and Pilots of Western Air Express, Inc., which operates the 660 mile contract Air Mail Route between Los Angeles and Salt Lake City. Seven Douglas Mail planes, STANDARD STEEL PROPELLER equipped, provide the initial flight units of this line. They have a high speed of 145 m.p.h., and cruising speed, with pay load of 1000 lbs., of 110 m.p.h.

STANDARD STEEL PROPELLER COMPANY

PITTSBURGH, PENNA.

Contractors to U. S. Army, Navy and Air Mail

engines of 100 hp., as already stated. The engines are hung exactly half way between the forward and rear wing beams. The propellers are located to the rear of the wing, the drive being through a shaft. The engines are well streamlined and the mounting is hung from the front and rear beams by streamlined tubing.

The track of the wheels of the plane is very wide. The axles run up to either side of the bottom of the fuselage and the shock absorbing is done by a system of rubber cords in a vertical brace which runs up to the wings.

The plane has a span of 62 ft. 6 in. Its length is 50 ft. 10 in. and the height 12 ft. 2 in. The wing area is 701 sq. ft.

More Honors for Karl Arnstein

Dr. Karl Arnstein, vice president of the Goodyear-Zeppelin Corp. and builder of the airhsip "Los Angeles", and ninety other Zeppelins, has had the honorary degree of Doctor of Engineering conferred upon him by the Technical University of Aachen, one of Europe's foremost scientific institutions. Dr. Arnstein was advised of his most recent honor recently. He was awarded the degree of Doctor of Technical Sciences by the Technical University of Prague, Jan. 18, 1912.

The most recent honorary degree was granted by the president and faculty board of the famous old university in recognition of "his eminent merits and accomplishments in the development of airship construction, and especially for the establishment of scientific foundation of design and calculation of the rigid airship", his diploma from Aachen stated.

The Technical University of Aachen, is located in the ancient city of Aix-la-Chapelle, where Charlemange made his home 1100 years ago, close to the German, Dutch, and Belgian border lines, and has been the center of technical science in the western German industrial region for many years. It is principally famed for its college of mining and aeronautics.

Professor von Karman, head of the aerodynamics department, and L. Hopf, both scientists of international reputation,

Dr. Karl Arnstein

are faculty members, and H. Junkers, the designer of the airplane bearing his name, is a former member of the teaching staff at Aachen.

AIRPLANES FOR SALE

We sold over $110,000.00 worth of airplanes, motors and parts last year and still have a large number for sale. We believe the prices on airplanes are at their lowest, and a small deposit on any of our airplanes will hold same for spring delivery. We expect a sharp advance in prices very soon.

We still have plenty of Standards, Jennies, Canucks, Orioles, D.H.'s with Liberty motors, Spads less motors, T.M. Scouts with and without motors. A large number of these airplanes are set up, test flown, and ready for immediate fly away delivery. Come and take your pick.

NEW STANDARD J-1 AIRPLANES with guaranteed overhauled Hispano-Suiza motors, 150 H.P.	$1500.00
NEW STANDARD J-1 AIRPLANES with new OXX6 motors	1300.00
NEW STANDARD J-1 AIRPLANES with Government overhauled OXX6 motors	1100.00
NEW STANDARD J-1 AIRPLANES with new OX5 motors	1100.00
NEW STANDARD J-1 AIRPLANES with Government overhauled OX5 motors	900.00
NEW STANDARD J-1 AIRPLANES without motor	650.00

These airplanes come complete with tools and instruments and the front seat is built so as to accommodate two passengers. These airplanes have been reconstructed and new longerons, new controls, new wires, new struts, new fittings, new instruments were installed where needed. One-third deposit will hold any of the above airplanes for spring delivery, storage and insurance free.

No bond required
No charge for breakage

LEARN TO FLY
$100.00
INCLUDING SOLO

Room and board near field at $10.00 per week.

Eight years without an accident

76 Students Graduated in 1925

We guarantee to solo our students regardless of the number of flying hours required. We also furnish planes at very reasonable rates for those who wish to qualify for the F.A.I. pilots certificate and we maintain an employment agency for our graduate pilots.

The flying school of the Robertson Aircraft Corporation is one of the oldest and best known in the United States. Our instructors are ex-army aviators and are mail pilots with wide experience and our training equipment is the best obtainable. In over eight years of operation our students have never damaged a ship in their solo flights.

The flying field is approximately six miles from St. Louis and is easily accessible by railroad, street car and hard surfaced roads. It is the largest and best privately owned field in the country and the International Races of 1923 were held there. Mail planes arrive and leave daily.

Our course requires about two weeks, depending on the individual, and after its completion the refinements of the art can be gained only from experience. Commercial aviation is a rapidly growing industry. Don't delay! Enroll now!

WRITE FOR BOOKLET

It is not necessary to purchase an airplane in order to take this course.

ROBERTSON AIRCRAFT CORPORATION

OPERATORS OF UNITED STATES AIR MAIL ST. LOUIS-CHICAGO

LAMBERT-ST. LOUIS FLYING FIELD, ANGLUM, MO.

AIRPORTS AND AIRWAYS

Another First Flight

C. Fred Johnson, retired capitalist, who, for many years, was active in the Endicott-Johnson Company of Johnson, N. Y., world's largest shoe manufacturers, saw New York from the air recently at an altitude of 3,000 ft. Mr. Johnson was in the air a little more than one hour, taking off from Curtiss Field, Garden City, L. I., and flying not only over Manhattan but over sections of New Jersey, Westchester and Long Island.

Mr. Johnson, who is 71 years old, was a passenger in a Fairchild Fokker camera plane, piloted by Capt. R. H. Depew, vice-president of the Fairchild Flying Corp. of New York City.

It was Mr. Johnson's first flight, and he stated that he had never had a more enjoyable experience. Although the airplane made a speed of more than 100 m.p.h., he was in no way inconvenienced, because of the fact that he was seated in a comfortable enclosed cabin which enabled him to see the wonderful panorama below.

Atlanta, Ga.

By W. B. Hartsfield

Atlanta has established a modern landing field on a tract of 300 acres, 9 miles South of the city, in the middle of an old 2 mile auto speedway. It is a triangular field with two 2,000 ft. runways now in use and more work being done every day. At present the only facilities on the field are a wing cone and filling station.

The Florida Airways Co., begin operation of the air mail from Atlanta to Miami on June 1st, at which time there will be an opening ceremony, to which Army, Navy and civilian fliers will be invited.

The City is spending $25,000 this year and before the end of the year will have as fine a landing field as there is in the country, with every convenience and a most hearty welcome will be extended to visiting fliers.

Springfield, Ill.

By Arnold Willbanks

Les Smith has been working on his special OXX Standard, using all lower wings. It is a fine looking job and will be ready to fly shortly. Earl Smith is building up a regular Standard with an OXX. Glen Walling is rebuilding a Canuck with an OX5 engine. All three of these planes are being built at the Packard garage operated by Lord-Sudduth Co. Ralph Lord, one of the members of the firm, expects to finish his flying time as soon as the weather permits. Les Smith will also instruct Earl Smith, Glen Walling and Smith Hawkins, who are helping Smith with his special job. Les Smith had a peculiar experience with a Hall-Scott Standard last January, while en route from Kirksville, Mo., to St. Louis, when the crankshaft broke at the front bearing. The plane was landed safely at Honeywell, Mo. Everything landed but the prop, which was buried in a corn field some

DOPES

PIGMENTED DOPES
VARNISHES ENAMELS

»TITANINE«

MADE BY
TITANINE, Inc.
UNION, UNION COUNTY, N. J.
Contractors to U. S. Government

BRAND NEW JENNIES, original crates, perfect condition.$1500.00
New Jennies, uncrated for storage, excellent condition .. 1250.00
Very slightly used Jennies, splendid condition throughout. 1000.00
Used Jennies, ship and motor in good condition $650.00 to 800.00

Canucks, Standards, (three and five place), and Thomas Morse Scouts. Parts, accessories, motors, wings, dope and supplies.

Exclusive agents for STUART HIGH LIFT WINGS, *for* Standards, JN4s, or Canucks. *Write for information.*

Southern Airways Inc.
Visit us at either
Love Field, Dallas, Texas or San Antonio, Texas
Write our home office
210 College St., San Antonio

ALL METAL
Planes and Parts

SOME DESIGNERS have paid us the compliment of copying a detail or two here and there of the patented structures that we produce, gaining both in effectiveness and cost as to those particular items. Some invite attention to the fact, whilst others take pains to conceal it.

OTHERS HAVE bought from us, for parts of their structures, the accurately proportioned and balanced elements that we manufacture; thus realizing a further gain in weight saving effectiveness, and saving in the cost of development of tools and methods and in the cost of parts produced, yet applied to but a portion of the whole.

STILL OTHERS, by employing our designs and workmanship in their entirety, including license agreement, have been enabled to achieve the full advantage of our exceptionally light weights as well as that of our less costly methods.

LICENSE, withal, is not an expense, but promotes, in addition to the saving of first cost through a consistent use of machine shaped parts in a consistent design, the return to you of the fee in added earnings not once but every time you fly.

FOR INSTANCE, our methods do enable you to carry two passengers more in a plane of one ton gross flying weight, with the same performance. If you charged them $12.50 each, how many minutes would you have to carry them in order to refund yourself a license fee of $25.00?

CHARLES WARD HALL, *President*

CHARLES WARD HALL, INC.
156 EAST 42ND STREET NEW YORK
Contractors to the U.S. Navy

When Writing to Advertisers, Please Mention AVIATION

distance from the plane. As soon as the new engine is installed it will be used on the Springfield field.

Bill Meyers of Kirksville, Mo., one of Smith's students, flew down to Florida last fall. Joe Wright, located at Altamont, landed here Saturday en route from Peoria to Altamont. Mr. Wright has a Standard which Les Smith built and he also received his instructions here.

The air mail planes have been here from St. Louis several times looking over fields. The Chamber of Commerce is cooperating with the Post Office Department in obtaining a permanent field, which will take the place of the old fair grounds.

Say boys, don't get excited if you have a government inspector condemn your old crate as Les Smith experienced last week. One day last week a supposed to be aircraft inspector visited Smith's shops and told him that he was Captain C— from Washington, showing a badge which was the only credential he had. After a complete examination of wood work and fillings he checked up on the wings and told Smith and the rest of the boys at the shop that the wings must all be recovered as 18 months was the limit on linen and 12 months the limit on cotton. He soon gave himself away when he complained about his poor salary and said if Smith would patch up those small holes he hinted that it could be possible to put an OK on the old linen for the price of new cloth. After investigating about this young man, it was found out he was not Captain C— and did not happen to be an aircraft inspector. He also had a stolen car in his possession and when he came back to the shop the next dav he was greeted by the police force. However, I don't think he will bother around the shops any more for a while.

Crissy Field, Calif.

By R. P. Beebe

The Pacific Air Transport will commence operations soon. The company has been making surveying trips in the first of their ten Ryan monoplanes. The first mail trip will be about May 1. If there is a prettier flying combination than Mr. Ryan and his speedy new monoplane, I have yet to see it. Judging from Mr. Ryan's description, the plane must have an excellent performance with its 200 hp. Whirlwind engine.

The Army fliers new Loening Amphibian almost came to grief recently. The pilot, while making alternate land and water landings evidently became confused and landed on terra firma without letting down the wheels. Fortunately the long projecting "snout" of the plane kept it from turning over and the only repairing necessary was a new coat of paint on the bottom of the hull. Judging from the hole the Amphibian made in the field, Mr. Loening should try using his product as a steam shovel.

Crissy Field has received two new Douglas O-2 planes. Their snappy performance and the several mock air battles that they have staged are very interesting after constantly seeing the older DH's being carefully carried around by their pilots.

The Army pilots have been getting in some practice firing at sleeves lately. They always seem to come back full of holes. (I mean the sleeves.)

In spite of the fact that the field is alternately a sea of mud and a cloud of dust, The Reserves have been doing a lot of flying. They have an enviable record in these parts.

San Francisco is still searching for a municipal landing field. Some of the proposed sites have been like Florida land lots (under water.)

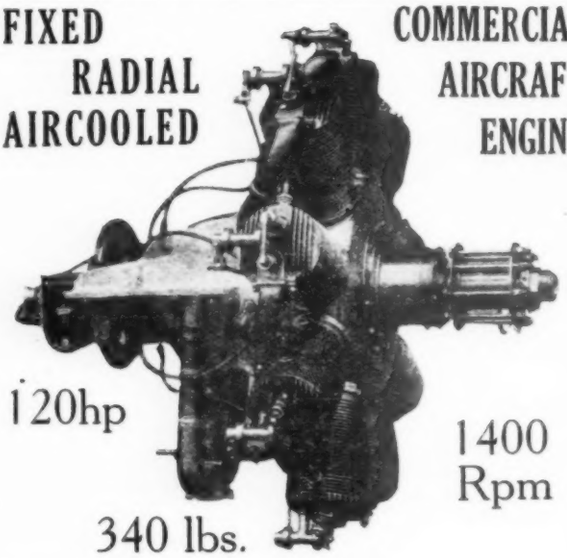
Boston, Mass.

By Porter Adams

Capt. Horace N. Heisen, Air Service, has taken over command of the Boston Airport from Lieut. Robert J. Brown, Jr. Captain Heisen was born in Oakland, Cal., in 1893, graduated from the University of California in 1915, subsequently receiving a law degree. He enlisted in the Air Service at the beginning of the World War and went overseas in January,

SUPER RHONE

FIXED RADIAL AIRCOOLED COMMERCIAL AIRCRAFT ENGINE



6½ to 10 gal. gasoline ¾ to 1 gallon mineral oil per hour.

Write For Booklet AV1

SUPER RHONE ENGINE & FLYING CORP.
PO BOX 153 HOUSTON, TEX.

LEARN *to* FLY

YOU FLY BY FLYING

THE SWEENEY SYSTEM

OF

PRACTICAL AIRPLANE MECHANICS

The Sweeney System

first prepares a student by intensive practical work on motors, building, recovering wings, rigging and all details of construction, repairing and handling. This is called ground school work.

Learn to Fly!

Aviation is no longer a mystery—no longer a hazard; no, it is a business growing greater and more important; you can qualify as a mechanic, or an engineer, or repair man, or builder; five men on the ground are needed for one man in the air, but if you want to become a pilot you easily master the work and can go into postal, government, or commercial work. Flyers are in demand, earning big money at fairs taking up passengers, etc. $5 for a 10-minute flight is pretty fine pay!

Opens up a world of opportunities for young men. The SWEENEY SYSTEM has no planes to sell, and sticks strictly to teaching both ground work and pilotage. Sweeney Airport is one of the best and safest fields in the U. S. All the resources of this MILLION DOLLAR SCHOOL insure you the best, most practical instruction. Mechanics earn $50 to $150 a week. Flyers up to $500.

You are thoroughly taught in the ground school. This fits you as an aviation mechanic. You are thoroughly taught motors, etc., and work with thousands of dollars worth of new material.
After completing this work if you want to be a pilot you take ten hours of flying.

Send Name Today

for full details of this aviation mechanical course and photographs of planes and equipment actually used; also full information as to the commercial end of flying and opportunities for young men.

LEARN TO FLY BY FLYING
Sweeney
SCHOOL of AVIATION
2504 SWEENEY BLDG, KANSAS CITY, MO.

1918, where he served as Commanding Officer of the 99th Observation Squadron. He then became commander of the 278th Observation Squadron and, in January, 1919, went to Germany with the Army of Occupation returning in June of that year to the United States. In September, 1919, he was detailed to the office of the Chief of Air Service at Washington where he remained until August of 1921, when he went to Langley Field as a student in the Air Service Tactical School and, upon graduation, became commander of the Tactical School Detachment where he remained until ordered to Boston. Captain Heisen, who is a brother-in-law of Maj. E. B. Lyon, former air officer of the First Corps Area, has taken a house at 53 Brookdale Road, Newtonville, Mass.

Cy Caldwell, pilot of the Boston Airport Corp., has returned to Boston after a several weeks flying trip through the South. This included stops at Hartford, New York, Philadelphia, Baltimore, Washington, Newport News, Norfolk, Fayetteville, N.C., Charlotte, N.C., Langley Field, Va., and Fort Mills, S.C.

Coincident with the return of Cy, Dan Sayre, president of the Boston Airport Corp., returned to Boston from a trip to Florida. He reported great aviation activity in the South.

Mayor Nichols, who petitioned the State Legislature, asking that the City be authorized to spend money for the improvement of the Boston Airport, was denied extension of the rules which would have been necessary to have had the bill come before the Legislature this session. The bill was drawn up after Mayor Nichols had been notified by the Corporation Counsel of the City that the item of $25,000 included in his annual budget for the Airport was not a legal expenditure of City money. It is believed that this bill will be reintroduced at the next session of the Legislature and should undoubtedly go through.

The Ways and Means Committee of the great and general court of the Commonwealth of Massachusetts do not know what they missed on Tuesday of last week when Cy Caldwell, together with several others, appeared to speak before them on the bill providing for the extension of the lease at the Boston Airport. Various other matters detained the Committee all morning until one o'clock when Cy had to leave, but shortly afterwards the Airport matter came up. As Commissioner Williams, of the Department of Public Works, strongly favored the bill and no one appeared against it, it is believed that it will receive favorable consideration by the Committee.

Lieut. Frank C. Crowley, who has made such a splendid flying record from the Boston Airport, is now temporarily on duty with the First Pursuit Group at Selfridge Field, Mich. Lieutenant Crowley is the only reserve officer in New England who has the distinction of being ordered to Selfridge Field for active duty with the First Pursuit Group.

Plane to Strew His Ashes

In his will, filed for probate in Newark, John E. Stromenger, a salesman of that city, directed that his ashes be carried aloft in an airplane and scattered "over a large body of water." A son, John E. Stromenger, the executor, was directed to have the body cremated and "in due time" turn the ashes over to Dickinson W. Stromenger, another son, who is to take them aloft and scatter them.

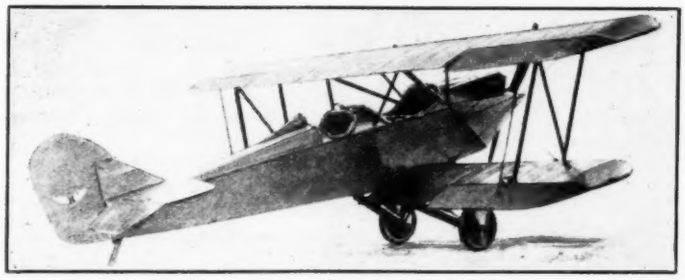
Fort Worth, Texas

By G. F. Bischof

Fort Worth's flying mileage won't reach 100,000 this year. Several fliers have left these parts for other fields and their records cannot be obtained. The sum of the mileage from those reached only amounts to 78,225. On account of the slow movement of aviation in this city some of the fliers have found positions in other cities, two of them going on the new mail route thru here. It would not be surprising to see quite a few of Fort Worth's fliers leaving as there have always been a number of circus fliers here, this city being

For

COMMERCIAL AVIATION



FOUR PASSENGERS SEATED COMFORTABLY
800 LBS. USEFUL LOAD — 42 CU. FT. COCKPIT SPACE

These three facts make the aviator realize the tremendous earning power of the HESS "Bluebird" even before a price of $2250.00 flyaway Detroit is mentioned.

HESS
AIRCRAFT COMPANY
532 1st NATIONAL BANK BLDG. DETROIT, MICH.

THE CURTISS PULITZER RACING PLANES
ARE EQUIPPED WITH
OUR SHOCK ABSORBER CORD

Pioneers in the Manufacture of Elastic Cord for Shock Absorbers in this Country.

Principle Producers of Cord for Canadian and U. S. Governments during the World War.

Fully Equipped for the Largest Requirements or Any Experimental Tests.

J. W. WOOD ELASTIC WEB CO.
STOUGHTON, MASS., U.S.A.
New York Office—45 E. 17th St.; Canada—32 St. Peter St., Montreal

FLIER OR AVIATOR?

Investigate the experience, reputation and equipment of that school of aviation before you enroll.

OUR COURSE INCLUDES—
Flying instruction — Solo experience —
Aerial motor repairing — Rigging —
Wing covering — Theory —
All branches of ground work

Write For Full Details and Prices

The Aero Corporation of California
Western Ave. at 104th St. Los Angeles, Calif.

The Aeroplane

Published Weekly

175, Piccadilly, London, W.1
England

CHARLES GREY
Editor

Subscription Rates
for U.S.A.

1 year—$8.50

their winter home.

Ross Arnold who has been circus flying for several years and who is a good one, has, according to rumors, been engaged by the National Air Transport Co.

We have at least one good booster in the person of our Mayor, H. C. Meacham, he sports the button of the N.A.A. and he has been largely instrumental in helping Fort Worth to her landing field.

Col. William Mitchell came in on April 4 rather early but was met at the station by members of the Fort Worth Flying Club and escorted to the Texas Hotel where he preferred to rest the balance of the day declining the invitation to show him around the city. All indications are that he will have a big crowd at the auditorium where he is to speak on April 6.

United States Air Forces

Advanced Flying School

Of the present class of the Advanced Flying School at Kelly Field, Texas, which started with 95 students, one has been relieved due to physical disability and 94 students are now in training. On March 31, 41 students had progressed to solo and 53 still remained on dual flying. The class has so far been unfortunate in their number of flying days since arrival at Kelly Field, as March 31 was the 19th working day of the course and during that period there were only 9 flying days, the other 10 days not being available for flying due to low clouds with fog and rain. The present class at the school began with 35 officers of the Regular Army, two Marine Corps officers, one officer of the Argentine Navy and 57 flying cadets. There are four special observation students sent here for the six months' course in Observation Aviation. Owing to the small number of flying days, this present class averaged about 1 hr. 20 min. per student the first week of training, forty minutes per student the second week and 2 hr. 50 min. per student the third week. The class has been flying DH's since the transfer of the O2's to the Attack Group.

Passing of the Jenny

The new class at the Primary Flying School, Brooks Field, San Antonio, Texas, started flying on Wednesday, March 31, each instructor having either five or six students. For the first time in the history of the Air Service, no Jennies are b ing used for training. Although the PT, which has replaced the famous Jenny is a good machine, there is a great deal of wistfulness and longing among instructors for their old sweethearts. In fact, a projected party in honor of the passing of the JN6 has met with only half-hearted response, due to the sadness of the occasion.

Despatching Smallpox Serum By Plane

In response to an urgent request for delivery of smallpox serum to the town of Winchester, in East Texas, where delivery could not otherwise have been made for a day or two, 1st Lieut. James E. Duke, Jr., Air Service, of the San Antonio Air Interemdiate Depot, carried a quantity of this serum by plane on February 25th to relieve the situation. Owing to the fact that there was no landing field at Winchester, the serum, which had been packed with great care in anticipation of this condition, was dropped from the plane and received without injury by the medical authorities of that town. The trip there and return was made in 2 hr. and 25 min.

Rain Making

Two DH airplanes were recently flown from Phillips Field, Aberdeen Proving Grounds, Md., to Hartford, Conn., where they will be used to conduct certain experiments in rain mak-

ing and fog dispersal by Dr. L. Francis Warren. These two airplanes, which are fully equipped for the work at hand, were flown to Hartford by Major E. A. Lohman and Technical Sergeant Samuel J. Davis.

Lieut. Louis N. Eller, A.S., on duty at Hartford as National Guard Instructor, will cooperate with Dr. Warren in these experiments, assisted by Sergeant Davis, who will be stationed at Hartford for several months.

Air Service Bombing

The War Department announces that the Air Service annual machine gun and bombing matches will take place at Langley Field, Va., May 5, 1926. All units of the Army Air Service will be represented, as well as the U. S. Navy, Marine Corps, National Guard and Organized Reserves.

The announcement states there will be one team from each bombardment, attack, pursuit, and observation squadron in the United States and Panama, two teams selected from officers on duty in the office of the Chief of the Air Service, and from the lighter-than-air subdivisions. The National Guard air units will enter five teams, and there will be one team from each of the Corps Areas to represent the Organized Reserves.

Balloon Officers of the World War

More than 50 active, reserve and former officers of the Balloon Section of the Army Air Service assembled at the second annual reunion and banquet of the organization in the Yale Club on Saturday, March 27. Similar reunions were held simultaneously for officers in the Middle West at St. Louis and officers on the West Coast at Los Angeles.

At the eastern dinner it was proposed to effect a permanent organization to perpetuate the traditions and ideals of all lighter-than-air officers in the World War. Of several plans of organization proposed the most favorably received was a suggestion that the national organization be patterned after the Society of the Cincinnati, the noted post-Revolutionary organization, in which membership is inherited by the lineal descendants of the original members. The selections of a name and the details of organization were left to a committee to be named by Col. Charles de. Chandler and the permanent organization will be effected at the next annual dinner. Former balloon officers who are eligible should send their names to David Q. Hammand, 150 Nassau Street, New York City.

Crash Narrowly Averted

An unusual incident, which might easily have resulted in a serious crash, occurred at Kelly Field, Texas, on the afternoon of March 22. Lieut. N. D. Frost, pilot, with Pvts. O. T. Flint and A. D. Webb, all of the 3rd Attack Group, were drop-testing parachutes from a Martin bomber. Three packs, with 250 lb. weights attached, were suspended in the bomb racks of the plane, and arranged to drop singly. For some unknown reason the first parachute failed to release and when the second one was let go, it tore into the first one, tearing the pack loose from its fastenings and leaving it suspended several feet below the fuselage, from the weight which remained secured in the rack. The rip cord was soon pulled out by the swinging pack, permitting the chute to open. A sudden reduction of speed was felt, the tail swinging skywards and the plane nosed down at an angle of approximately 45 deg. The test was initiated at 1500 ft., and when the incident occurred the plane was rendered uncontrollable for a few seconds until the parachute fortunately broke away from the plane. Approximately 500 ft. were lost before the plane was again under control. No damage was done beyond a small rip in one of the parachute panels.

Army Air Orders

Maj. Howard C. Davidson, A.S., relieved from assignment and duty as assistant military attache, London, and will proceed to Washington, for temporary duty in office of Asst. Ch. of Staff, upon completion of which he will proceed to Langley Field.

Maj. Clarence L. Tinker, A.S., Fort Leavenworth, to Wash-

RONALD AERONAUTIC LIBRARY

THE first comprehensive, organized library of practical aeronautics in any language. As planned, this library embraces aerostation as well as aviation. It includes volumes on aircraft instruments, gases, power plants, piloting and maneuvring, design and construction, air traffic, air warfare, balloon and airship fabrics, and subjects of like importance.

VOLUMES NOW READY

(Other titles to be announced shortly)

COL. C. DE F. CHANDLER

Editor of the Library, Lieut. Col., U. S. Army, Retired (Colonel, U. S. Air Service, Res.). A leading authority on aeronautics; well known pioneer balloon and airship pilot. Commanding officer of the first Army Aviation School at College Park, Md., later Chief of the Balloon Section, A.E.F.

Aeronautical Meteorology

By Willis Ray Gregg.

Carefully prepared to furnish the quickest, most direct means of acquiring the fundamental understanding of wind and weather conditions that is needed in practical aeronautics. 11 plates, 33 diagrams and charts. *144 pages. Cloth. $2.50.*

Aircraft Instruments

By H. N. Eaton and Other Specialists of the United States Bureau of Standards

Complete explanations of the theory and practical use of over 175 types and makes of aeronautic instruments of both American and European manufacture — practically all those in use today. The only comprehensive book of its kind; includes instruments for testing purposes as well as both ground and flight instruments. 10 plates, 58 line cuts. *269 pages. Cloth. $5.00.*

Balloon and Airship Gases

By C. deF. Chandler and Walter S. Diehl

Part I explains processes for producing, testing, and purifying both hydrogen and helium and describes methods for compressing and storing gases. Part II deals with the physics of gases and contains many valuable tables and formulas. 2 plates, 24 line illustrations. *226 pages. Cloth. $4.00.*

Send for Examination Without Charge

To examine any of these books check the title or titles of those desired on the order form below, and mail it to us. The books indicated will be sent postpaid. Within five days after receiving them send check for amount due, or, if unsatisfactory return the book or books.

THE RONALD PRESS COMPANY

Publishers: 15 East 26th Street, New York, N. Y.

— — — — — — — — Use This Order Form — — — — — — — —

The Ronald Press Company, 15 E. 26th St., New York, N. Y.

You may send me postpaid the book or books checked below. Within five days after receiving them I will remit in full for those I keep and return any others to you.

[ ] **Aeronautical Meteorology.** $2.50.
[ ] **Aircraft Instruments.** $5.00.
[ ] **Balloon and Airship Gases.** $4.00.

Name.....

Address.....

City..... State.....

Firm or Connection..... Rank or Position..... (M85)

Signature.....

To receive announcements of forthcoming volumes, check here [ ]

ington, for temporary duty with Asst. Chief of Staff, upon completion of which he will proceed to London and report to military attache for duty as assistant military attache.

Sec. Lieut. Mitchell A. Giddens, A.S., Kelly Field, to Fort Sam Houston.

Maj. Percy E. Van Nostrand, A.S., Fort Leavenworth, to San Francisco, sailing Aug. 19 for the Hawaiian Dept.

Capt. George S. Warren, A.S., Scott Field, to New York City, sailing July 28 via Gov. transportation to Hawaiian Dept.

International Newsreel

Officers of the dirigible Los Angeles, which has recently been undergoing its first flight since June, 1925. Left to right: Capt. George Washington Steele, Jr., Lieut. Comdr. Charles E. Rosendahl, Lieut. Comdr. Joseph Arnold, Lieut. Comdr. H. V. Wiley, Lieut. C. H. Havill, Lieut. T. B. Hendley, Lieut. Roland G. Mayer, Lieut. R. F. Tyler, Lieut. Chas. E. Bauch, Chief Machinist E. C. Thurman and Boatswain W. A. Buckley.

First Lieut. Walter H. Reid, A.S., upon completion of tour of foreign service, to Houston, Texas, reporting to com. gen. Eighth Corps Area for temp. duty.

Lieut. Col. Arthur G. Fisher, A.S., Fort Leavenworth, to San Francisco, sailing on transport Aug. 14 for Canal Zone.

Sec Lieut. Howard M. Fey, A.S., Brooks Field, to San Francisco, sailing Aug. 19 for Hawaiian Dept.

First Lieut. Frank M. Paul, A.S., Chanute Field, to New York City, sailing July 28, via Gov. transportation, to the Hawaiian Dept.

OF COURSE

You Want a Good
Good Looking
Comfortable
Well Fitting

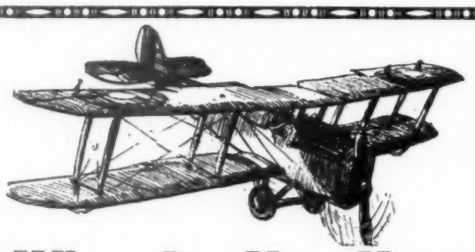
HELMET

Ours Are Made to U. S. Navy's Specifications
Cut in Longitudinal Sections
of Superfine Quality
Soft Glove Leather
Lined with High Grade Silk
Powder Puff Ear Protectors
Large Gun Metal Buckle
In Eight Sizes, Fit Guaranteed
$5.95 each

AIR TRANSPORT EQUIPMENT, INC.

CARLE PLACE, L. I., N. Y.

PHONE WESTBURY 376



What Do You Know About Airplanes?

A FEW years ago men had to learn about aircraft from personal, costly experience. They had no one to guide them—no one to point out mistakes when they were made—and therefore years were spent learning what takes months now.

THOROUGH — PRACTICAL TRAINING

Today the American School of Aviation offers you these long years of experience and knowledge, which cost millions to acquire, in their new and fascinating Home Study Course in Practical Aeronautics which has been highly endorsed by prominent aviation authorities.

WRITE TODAY

No matter whether you have worked with airplanes all your life or are just beginning in the industry you owe it to yourself to send for a complete and detailed outline of this training and our new and interesting free book, "Opportunities in the Airplane Industry."

American School of Aviation

Dept. 8273

3601 Michigan Ave., CHICAGO, ILL.

AIRPLANES :-: PARTS :-: MOTORS :-: SUPPLIES

When you want anything in the line of aircraft materials you want prompt shipment. The size of our stock amazes most aviators who visit our warehouses for the first time. Flyers from all parts of the country express the opinion that it is by far the largest and most complete they have ever seen. Our quality is unsurpassed. Prompt shipment and personal attention to all orders, added to our central location, assures immediate delivery. Order where the stock is complete—Last years sales of $200,000.00 indicate the volume of our stock and the large number of our satisfied customers. *Lowest Prices on Quality Merchandise.*

OX5 valves, exhaust, $.40, intake $.30, cylinders, $10.00, connecting rod assemblies $2.50, tie down yoke $.25, crank shafts $15.00, crank case, upper half $50.00, lower half $16.00, intake rocker arms $1.00, water pump assemblies $6.00, exhaust manifolds, each side $3.50, exhaust pipe with elbows, $1.50, carburetor assembly, Zenith, $12.00, intake manifold elbow, $1.00, intake Y pipe $3.00.

New Simms magneto, model L-8, right or left hand, equipped for Booster, for Hispano Suiza $20.00, for OXX6 $25.00. New Berling D-81 magnetos for OX5 $16.00. New Dixie 800 magneto, right or left hand, for Hisso $30.00. We carry a complete stock of spare parts for the L-8 Simms magnetos.

10 lb. air gauges, $1.00, oil gauges, 25 lb. $1.00, 50 lb. $1.50, 60 lb. $1.75, 120 lb. $2.50, Zenith new type altimeter, 4 inch dial $9.00, 8 day clocks, 17 jewel $10.00, Fahrenheit gauges, brand new $6.50, Johns-Manville tachometer shaft and housing 7½ to 10 feet, $6.00 to $7.50, gas gauges $5.00, Johns-Manville adapters, 1 to 2, $6.00, knife switch $.50, gasoline tank shut off with sediment bulb $1.50, Bosch double ignition switch $3.50, Grade A cotton, yard $.35, plain tape, yard $.03, 2" x 2¼" scalloped tape $.06, cloth propeller cover $2.00.

New JN Radiators, $25.00, 26 x 4 casings, Goodyear, new production $12.50, 26 x 4 inner tubes, $3.00, 750 x 125 D.H. inner tubes $3.50.

PROPELLERS.

Hispano, 150 H.P. new copper tipped toothpick $50.00. Hispano, 150 H.P. new cloth tipped toothpick $30.00. Hispano, 150 H.P. new leather tipped Westmore $25.00. OX5 new copper tipped toothpicks from $10.00 to $20.00 each. OX5 new copper tipped Clubs from $10.00 to $15.00 each. Lawrence 28 H.P. 2 cylinder Lawrence new $15.00.

New production clear nitrate dope, bbl. lots, 50 gallon, per gal. $1.45. New production clear nitrate dope, half bbl. lots, 30 gallon, $1.60 per gallon. New production clear nitrate dope, five gallon cans, per gallon $1.90. New production clear nitrate dope, one gallon cans $2.00.

AEROSPAR CLEAR VARNISH

30 gallon drums, per gallon $2.75
5 gallon cans, per gallon $3.75
1 gallon cans $4.00

GENUINE VALENTINES VALSPAR VARNISH

5 gallon cans $5.50 per gallon
1 gallon cans $6.50

Summer weight flying suits, white with insignia $6.50, Khaki Government model with big map pocket $10.00, NAK goggles, Resistal glass $4.75, Jumbo $3.50, Gogglettes, French design, $3.50, Italian Gogglettes $6.00.

New Standard J-1 ships complete with new OX5 motor, $1100.00. New Standard J-1 ships complete with Government overhauled OX5 motor, $900.00. New Standard J-1 ships complete with used OX5 motor, $800.00. New Standard J-1 ships complete with new OXX6 motor, $1300.00. New Standard J-1 ships complete with slightly used or overhauled OXX6 motor, $1100.00. New Standard J-1 ships complete with 150 H.P. Hispano motors, all motors are A1 condition and completely overhauled $1500.00 to $1800.00. New Standard J-1 ships complete less motor, $650.00.

MOTORS.

OX5 used $75.00 to $150.00 each, OX5 Army overhauled $250.00 each. OX5 our own overhauled $200.00 each. *OX5 brand new in the original crates, prices from $275.00 to $500.00 each, owing to quantity purchased. Write for full details.*

OXX6 used, $175.00 to $250.00 each. OXX6 overhauled $350.00 each. OXX6 used about 20 hours $400.00 each. OXX6 brand new $700.00 each. 80 H.P. LeRhone, used about 5 hours $30.00 each. 80 H.P. LeRhone new $50.00 each. Liberty Six new $800.00 each. Hispano Suiza model A 150 H.P. A1 condition completely overhauled $500.00 each.

We have the largest stock of airplane motors in the United States. We just completed the purchase of fifteen hundred brand new OX5 motors from the Horace E. Dodge Boat Works of Detroit, Mich. These, we believe, are the last new OX5 motors that will ever be available. Have already sold several hundred of them to manufacturers.

FLYING INSTRUCTIONS.

Three Separate Courses Are Offered.

$100.00 $150.00 $200.00

No charge for Damage to Planes. Instructors are men of long experience who take personal interest in their students, thus reducing any danger of accident to ships and students to a minimum. Only new equipment is used for instruction purposes. Best of living conditions and very reasonable rates for board and room. Transportation to and from field furnished without charge—Choose an aviation center for your instructions. You can learn to fly here.

Write for Complete Catalog and Literature

NICHOLAS-BEAZLEY AIRPLANE COMPANY. **Marshall, Missouri.**

85 MILES EAST OF KANSAS CITY. *ON CHICAGO & ALTON AND MISSOURI PACIFIC R. R.*

PLYWOOD

Water Resistant Panels

Made According to

Government Specifications

Any Size or Thickness

New Jersey Veneer Co.

Paterson, N. J., U.S.A.

Seamless Steel Tubing

ROUND, STREAMLINE, ETC.

Furnished to Specifications in

STRAIGHT CARBON
NICKEL STEEL
CHROME MOLYBDENUM

Specialists in Aircraft Tubing—Manufacturers for 25 Years.

SUMMERILL TUBING COMPANY

BRIDGEPORT, MONTG. CO. (Philadelphia District) PA.

Perry - Austen

COMMERCIAL

Acetate Nitrate **DOPES** Clear Pigmented

Contractors to United States Government

NEW FINISH—GLOSS PIGMENTED DOPE
SAVES COAT OF VARNISH

Write for Information.

Perry - Austen Mfg. Co. - Staten Island - N. Y.

JOHN A. ROEBLING'S SONS CO., TRENTON, N.J.

Lieut. Col. John M. Howard, A.S., Baltimore, to New York City, sailing July 28, via Gov. transportation, to the Hawaiian Dept.

First Lieut. Charles C. Chaunery, A.S., Washington, to New York City, sailing July 28, via Gov. transportation, to the Philippine Islands.

First Lieut. James A. Woodruff, A.S., Chanute Field and Kelly Field, to San Francisco, sailing on transport Aug. 20 for Philippine Islands.

Following officers, A.S., relieved from assignment and duty at station indicated, and will proceed to New York City, sailing on transport Aug. 20 for the Philippine Islands: First Lieuts. Hez McClellan, Robert M. Webster, Hugh A. Bivins, Frederick I. Patrick, Brooks Field and Sec. Lieut. Dudley W. Watkins, Brooks Field.

First Lieut. Charles B. De Shields, A.S., New York City, to temporary duty Mitchel Field, upon completion of which he will sail July 28 for the Philippine Islands.

Maj. Follet Bradley, A.S., upon completion of tour of foreign service, to Langley Field.

Maj. Robert E. M. Goolrick, A.S., upon completion of tour of foreign service, to Langley Field.

Following officers, A.S., upon completion of tour of foreign service, assigned to duty at stations indicated: Maj. George E. Lovell, jr., Bolling Field, First Lieuts. George O. Robertson, Chanute Field, Everett S. Davis, Langley Field and Sec. Lieut. Donald W. Norwood, Brooks Field.

Following officers, A.S., upon completion of tour of foreign service, assigned to duty at stations indicated: Capt. Lynwood B. Jacobs, Fairfield, First Lieut. Shiras A. Blair, Fairfield, First Lieut. William V. Andrews, Mitchel Field, First Lieut. James G. Taylor, Kelly Field, First Lieut. John W. Monohan, Kelly Field, First Lieut. Frederick P. Kenny, Brooks Field, Sec. Lieut. Alfred A. Kessler, jr., Brooks Field, Sec. Lieut. Benjamin W. Chidlaw, Brooks Field, Sec. Lieut. Orval R. Cook, Brooks Field, Sec. Lieut. Hilbert M. Wittkop, Brooks Field.

Capt. Harvey W. Cook, A.S., Langley Field, to Fort Hayes, for temporary duty, upon completion of which he will proceed to Kokomo and take station.

Sec. Lieut. Ernest A. Suttles, A.S., Kelly Field, to Fort Sam Houston.

Sec. Lieut. Jeffery Raymond Starks, A.S. Res., Washington, to report to Chief of A.S. for training, reverting to inactive status May 2.

Capt. Howard J. Houghland, A.S., Fort Leavenworth, to New York City, for assignment to duty with the Fourth Army Air Service.

Maj. William L. Moose, jr., A.S., New York City, to Mitchel Field.

Navy Air Orders

Lieut. Harold B. Sallada det. inspr. of Nav. Aircraft, Consolidated Airef. Corp.

Lieut. Matthias A. Thormahlen det. com. Nav. Air Sta., Cape May, N. Y., to Nav. Home, Phila.

Lieut. Raymond D. MacCart (CC) det. Inspr. Nav. Airef., Curtiss Airplane Corp., Buffalo.

Ch. Gun. Le Roy H. Ripley det. Rec. Ship San Francisco, to Nav. A. Sta., San Diego.

Lieut. Comdr. Earl W. Spencer, jr., det. Nav. Air Sta., Pensacola, to Airef. Sqdns., Setg. Flt.

Lieut. Comdr. Hugh C. Frazer det. Nav. Air Sta., Pearl Harbor, to Nav. War Col., Newport.

Lieut. John F. Wegforth det. VT Squad. 2, Airef. Squad., Battle Fleet, to Nav. Acad.

Lieut. (jg) John M. Higgins det. Nav. A. Sta., Pensacola, to U.S.S. Ludlow.

Ens. Milton H. Roths det. Nav. Air Sta., Pensacola, to U.S.S. Ramapo.

Ens. George E. Peterson det. Nav. Air Sta., Pensacola, to U.S.S. Putnam.

Lieut. Forrest P. Sherman det. Nav. Air Sta., Pensacola, to Nav. War Col., Newport.

Ch. Bosn., Geo. R. Groh det. Nav. Air Sta., San Diego, to Aircraft Squad., Battle Fleet.

"HEART O' THE HILLS"
RARE OPPORTUNITY

We offer 300 and odd acres of isolated property in the heart of a Connecticut State Forest Reserve (Litchfield County). Level cultivated fields, meadows, wood and pasture lands. Suitable for club or private estate. Sites available for buildings, hangars, landing fields, 18 hole golf links and tennis courts. Extensive views. Elevation 1400 ft. A short hour's flight from Long Island. One mile from Housatonic River Valley, seven miles from upper Harlem Valley and Auto Trunk Line Highway. One mile from Housatonic Auto Trunk Line Highway.

For further particulars and terms address
RIPLEY BLOUNT & COMPANY
FALLS VILLAGE, CONN.
If you're looking for country property, write us.

The Alexander Eaglerock
Beauty of Design and Rigidness of Construction
Exceptional PERFORMANCE with OX5 motor
Greater Load Carrying Capacity
and it has
Ample Space for Pilot and Passengers
PRICE $2475 — DENVER FIELD
ALEXANDER AIRCRAFT CO.
Associated with Alexander Industries
ROOM 401, ALEXANDER INDUSTRIES BLDG.
DENVER, COLO.

FERDICO AVIATION
LIQUID MARINE GLUE
Elastic Durable Tenacious

Permanent Resilient Waterproof
Most perfect Marine Glue ever produced for pontoon construction
WRITE FOR INFORMATION AND SAMPLE.
L.W. Ferdinand & Co.
152 Kneeland Street, Boston, Mass.

METEORMOTOR
THE LIGHTWEIGHT CHAMPION
MODEL 72
20 - H.P.

WEIGHT
60 - LBS.
IRWIN AIRCRAFT CO.
Established 1908
SACRAMENTO CALIFORNIA

INDEX TO ADVERTISERS

Aero Corporation of California 680
Aero Supply Co. 685
Aeroplane, The 680
Advance Aircraft Co. 654
Aircraft Service Directory 690-691
Air Transport Equipment Co. 682
Alexander Aircraft Co. 684
American School of Aviation 682
Anderson Aircraft Mfg. Co. 691

Boeing Airplane Co. 655
Bohn Aluminum & Brass Corp. 673
Box 450 691

Classified Advertising 688
Cook, A. Wellington 690
Crawford Airplane Co. 691
Curtiss Aeroplane & Motor Co., Inc., The 658

Decatur Aircraft Co. 690

Ferdinand & Co., L. W. 684

Guggenheim School of Aeronautics 691

Hall, Inc., Chas. Ward 677
Hamilton Aero Mfg. Co. 690
Haskelite Mfg. Corp. 691
Hess Aircraft Co. 679
Huff, Daland Airplane, Inc. 690

Ireland, G. S. 691
Irwin Aircraft Co. 684

Johnson Motor Products, Inc. 691

Kreider-Reisner Aircraft Co., Inc. 691

Ludington Exhibition Co. 691

Monumental Aircraft Co. 690

New Jersey Veneer Co. 683
Nicholas-Beazley Airplane Co. 683

Paragon Engineers, Inc. 691
Perry-Austen Manufacturing Co. 683
Pioneer Instrument Co. 690
Polachek, Z. H. 691

R. F. D. Co., The 691
Reed, S. A. 691
Ripley-Blount & Co. 684
Robertson Aircraft Corp. 676
Roebling's Sons Co., John A. 683
Ronald Press Co., The 681
Ryan Airlines, Inc. 656

Scintilla Magneto Co., Inc. 657
Service Steel Co. 690
Southern Airways, Inc. 677
Standard Oil Co. 669
Standard Steel Propeller Co. 675
Summerill Tubing Co. 683
Super Rhone Engine & Flying Corporation 678
Sweebrock Aviation Co. 690
Sweeney School of Aviation 678

Tabraham, Geo. E. 690
Taylor, C. Fayette 690
Tips & Smith 691
Titanine, Inc. 677
Tri-State School of Aeronautics 691

Wallace Aircraft Co. 690
Where to Fly 686
Wood Elastic Web Co., J. W. 680
Woodson Engineering Co. 685
Wright Aeronautical Corp. 692

Yackey Aircraft Co. 690

WOODSON EXPRESS

Type 2-A Four Place

FOR PERFORMANCE, RELIABILITY, MANEUVERABILITY, SAFETY AND ECONOMY, THE WOODSON EXPRESS IS UNEQUALED.

This model will carry a pay load of 600 pounds exclusive of pilot and fuel for 4 hours and has a seating capacity for three passengers and pilot making it a most desirable all-around plane.

FOR EXPRESS, MAIL AND PASSENGER LINES, TAXI SERVICE, MAPPING, SKY-WRITING, ETC.

Powered with either the 260 HP Salmson water cooled radial or the 200 HP Wright J-4 Whirlwind air cooled radial.
Deliveries are being made in numerical order and orders for early spring delivery must be placed now.

It Will Pay You Well To See This Plane Before You Invest In Other Equipment.

We will gladly give a demonstration without obligation, at any time you can arrange to visit our field at Bryan

Write or wire now for appointment

WOODSON ENGINEERING COMPANY
BRYAN, OHIO

At Your Service

Aero Supply Mfg. Co., Inc.

Manufacturers and Distributors
of
Airplane Accessories and Supplies

Call on us for anything. We will help you.

College Point, Long Island, New York.

Where to Fly

CALIFORNIA

THE RYAN SCHOOL OF AVIATION

O. B. STAR ROUTE SAN DIEGO

Ideal flying weather all Seasons. Very best of planes and instructors. Opportunity to study latest planes and construction.

A few recommended students will be given employment in our shops, while learning to fly.

CONNECTICUT

NEW ENGLAND AIRCRAFT CO., INC. New England's largest, most complete airdrome, of 96 acres. Commercial flying service. Complete flying instruction. Inter-city passenger and light express service by appointment. Advertising, photography. Our rates are reasonable and we make commercial pilots. Waco 9 distributors for New England.

805 MAIN ST., HARTFORD, CONN.

FLORIDA

Modern planes for any purpose, at any time. Rates reasonable. Flying schools located at Atlanta, Ga., Daytona Beach and Tampa, Fla., where you can fly in comfort in any season. South Eastern Distributors for Swallow Airplanes.

Address all correspondence to A. B. McMULLEN COMPANY

15 PEACHTREE ARCADE, ATLANTA, GA.

ILLINOIS *Only 50 miles west of Chicago*

EAGLE AIRPORT SCHOOL OF AVIATION.

Herman J. Neubauer, M.D.

Hinckley, Ill.

Learn to Fly at our up-to-date school at very reasonable prices. Complete ground and air course. Come any time. Ideal accommodations for students. Expert instructors. Write for information.

ILLINOIS

MID-WEST AIRWAYS CORPORATION

MONMOUTH, ILLINOIS.

Complete flying instruction and ground course. Large safe field and good airplanes. Distributors for the new Waco airplane.

ILLINOIS

PARTRIDGE, Inc.

Aeronautical Instruction

Aero Club of Illinois Mail Address:

Field: Chicago, Ill. *Write for Booklet* 430 S. Michigan Ave.

ILLINOIS. **YACKEY'S CHECKERBOARD FLYING FIELD.**

Operated by the Yackey Aircraft Co., one of the oldest flying schools in the U. S. The Yackey Aircraft Co. is conducted by men who have made a success in all branches of flying before the war — — in the war and after the war — — U. S. Army, U. S. Air Mail and Civilian. You can only learn from one who knows. You only know from experience. We have proven our ability. YACKEY AIRCRAFT COMPANY, Forest Park, Illinois.

ILLINOIS **CAMPBELL AIRPLANE CO.**

Best equipped commercial field in the middle west. 24 hour service with night flying equipment and used by N. A. T. mail line Chicago to Dallas. A limited number of students accepted for training at reasonable rates. We invite cross country pilots to make use of our facilities.

Mail address 515-18 ST., MOLINE, ILLINOIS.

INDIANA

HOBART AVIATION CO. Flying Course, including complete ground course, $185.00. Ideal flying country, competent instructors, thirty miles from Chicago, Ill. on the trans-continental air mail route. A few students will be given employment in our shop. Write for details. No bond for solo flight. *Flying Field,* HOBART, IND. *Mail Address,* 1106 BROADWAY, GARY, IND.

MARYLAND LOGAN FIELD.

CHESAPEAKE AIRCRAFT COMPANY, Headquarters Armory, Baltimore. Passenger and express service. Aerial photography and advertising. Flying school $250. for course. No bond for solo. *Agents for TRAVEL AIR Planes, Maryland, Virginia & District of Columbia.* Phone Vernon 3760.

MICHIGAN

DETROIT'S OWN AVIATION SCHOOL.

Complete Courses in: Aero Motor Repair, Airport Supervisory, Airplane Construction, Flying.

DETROIT SCHOOL OF AVIATION—3967 GRAND RIVER AVE.

DETROIT, U.S.A. *Air Center of the World.*

MICHIGAN

NILES SCHOOL OF AVIATION, Niles, Michigan. Spring class in flying starts May 10th. Enroll now. Instruction under expert pilots. No deposit for soloing. Write for information.

J. R. WILLIAMS, NILES AIRWAYS.

MISSOURI

NICHOLAS-BEASLEY AIRPLANE CO. Complete flying instructions, by hour or by complete course, primary, cross country, advance training, solo. New ships and new motors. Instructors who take an interest in you. No deposit required on solo flight. Write for full particulars. **MARSHALL, MISSOURI.**

MISSOURI

LEARN TO FLY! *ONLY $100.* Our instructors of long experience, our modern training airplanes, and the best flying field in the Middle West make us the best equipped school in the country to teach you to fly properly. *Enroll Now.*

PORTERFIELD FLYING SCHOOL, *Richards Field,* Kansas City, Mo.

NEW YORK

FLYING SCHOOL—Operated in connection with our shops assuring a Liberal Knowledge of Design and Construction at no additional expense. Competent Instructors. *Reliable Machines.* Passenger Flights and Cross Country Service. Write for Details. **AERIAL SERVICE CORP., HAMMONDSPORT, N. Y.**

NEW YORK

CURTISS FLYING SERVICE INC., GARDEN CITY, N. Y.

Complete Flying Service including Instruction, Aerial Photography, Advertising and Passenger carrying. Fast cross country transportation at a moment's notice to any point with either land or water types. Air fleet of thirty machines. Flying the year round. *Big reduction in rates for Flying Instruction.*

Write for information.

NEW YORK

PORT WASHINGTON, LONG ISLAND

FLYING BOAT SCHOOL Clifford Webster—Instructor

Winter Station Jan. 1-May 1 Palm Beach, Fla.

Curtiss Metropolitan Airplane Co., Inc.

OREGON.

FLY IN THE NORTHWEST.

RANKIN SCHOOL OF FLYING - 408 Oregon Building.

PORTLAND, OREGON.

PENNSYLVANIA *PITTSBURGH*

PITTSBURGH-McKEESPORT AIR PORT — 9 miles from business center of Pittsburgh; 2 miles from business center of McKeesport; Fast Interurban Cars past field. *A splendid fourway field — Look for our big circle.* Eastern Distributing Point for Swallow Airplanes. *Office address,* 504 STANDARD LIFE BLDG., Opposite P. O., PITTSBURGH, Pa. *Visitors Cordially Welcome.*

PENNSYLVANIA

PITCAIRN AVIATION, Inc.

Land Title Bldg. Philadelphia.

4-way flying field, largest in East, on Doylestown pike, above Willow Grove.

4 instructors, ideal flying country, busy field, reasonable board. Our flying course includes meteorology, map-reading, etc. Waco, Standard, Oriole and Jenny airplanes available for graduate students at low rate. No liability bond required.

WRITE FOR BOOKLET.

TEXAS Year-round Flying

SAN ANTONIO AVIATION & MOTOR SCHOOL

Expert instruction in flying and mechanics

Free sleeping quarters at Airdrome

AIRPLANES, ENGINES, PARTS, SUPPLIES, SHOPS, HANGARS, OX5s, Hissos, Liberties, Jennies, Canucks, Standards

Large stocks on hand, prompt shipment, best values.

Office 509 Navarro Street San Antonio, Texas.

WEST VIRGINIA **SHANK McMULLEN AIRWAYS,** Inc.

Flying school second to none. Thorough instruction on flying boats and airplanes by expert ex-army instructors. Complete flying service including photography, advertising, exhibition, passenger and fast cross-country transportation.

HUNTINGTON WEST VIRGINIA

PUBLISHER'S NEWS LETTER

Through the courtesy of the Imperial Airways, this News Letter is being written aboard the three-engine Handley Page air transport plane flying from Croydon, the terminal airport of London, to Le Bourget, the corresponding airport of Paris. Of course, the trip has been described so often that the details of the route are well known. From the operation viewpoint, it may be of interest to know that on the day on which the trip is being made, Good Friday, thirty passengers were booked and three motor busses took them from Hotel Victoria to Croydon in exactly 30 min.

A half dozen large air transport planes were ready for their tourists, for a four day holiday was starting in London. English, French and Dutch aircraft could be seen, but it was our good fortune to occupy two of the fourteen seats in the big Handley Page. Although 60 per cent of the passengers of the Imperial Airways are women, there was only one other lady passenger besides our constant flying companion.

* * * *

Bumpy air soon caused one of the men passengers to have evident discomfort but otherwise the passengers all seem to be enjoying the trip immensely. The usual flying altitude is about 1,500 to 2,000 ft. The air speed is around 100 m.p.h. but a 30 mile head wind is blowing so that the ground speed is comparatively slow. The goods carried on a holiday consist principally of baggage,—a trunk or two being carried by travelers de luxe. Our seven pieces were generously carried as an added courtesy.

It is interesting to note the absolute lack of movement of the ailerons, the inherent stabiliy of the plane, and the comparative quiet of the engines. Cotton, in small containers, is provided, and much used. Altimeters and air speed indicators are in view at all times, so that these two points can be watched. It took about an hour to reach the English Channel which was crossed in less than a half hour. After another half hour, a sudden turn indicated that a landing was to be made although there were 125 more miles to be covered. As a beautiful emergency landing field came up to meet us, all the passengers were glad to have the opportunity to take a short walk. The head wind had added about 100 miles to the usual route, and the pilot, Captain W. R. Hinchliffe, who, by the way, flies better with one eye than most fliers do with two, decided that Abbeville was a good place to take on gas. A very primitive method required over an hour for the operation, but soon, we were again on our way and, in shortly over an hour, the great Aerodrome du Bourget, the largest in Europe, came in sight.

* * * *

Regarding the first trip of what may be one of the longest air tours ever made, nothing but praise could be expressed. Naturally, we figured that each passenger required about 100 hp. and made a few estimates as to the cost of the trip and made certain calculations as to the revenue, but it was of little practical value. In fact, one of the most secret matters in Europe is the financial operation of the air lines. This appears to be due to several obvious reasons. As all of the lines are given a subsidy, it is natural that they keep their accounts so that the giving of the subsidy will be justified. If a European air line ever makes money it will be known only to a very limited few. It might be such a shock to the public that it would not continue to regard money grants for air lines with the satisfaction it does now. Each country has been educated to believe that air lines are a great military asset, a point which has been questioned in these pages very often. Here in Europe, however, the problem of air offensives and defensives is so important that air lines are now becoming as important in the scheme of national defense as were the old military roads.

* * * *

The airports at Croydon and Le Bourget are probably the most interesting in Europe owing to their international character. They are, in a true sense, air terminals and represent civil air transport facilities at their best. Croydon is being made into a permanent establishment with commodious steel and brick hangars. Le Bourget is permanent now and has huge hangars which are used for repairing planes as well as storing them. Perhaps, if time and space will permit, a later News Letter will give some of the more specific details of the operation of airports which has been carried to a very high state of perfection. This letter, begun on an air journey and finished amid the distractions of Paris, may, by its disconnected narration, give some idea of the difficulties under which these notes are written.—L.D.G.

CLASSIFIED ADVERTISING

10 CENTS A WORD, MINIMUM CHARGE $2.50, PAYABLE IN ADVANCE.
ADDRESS REPLIES TO BOX NUMBERS, CARE AVIATION, 225 FOURTH AVE., NEW YORK.

FOR SALE: Brand new Aeromarine, 135 hp., motor, with spares, type U6D, built in hand and electric starter and generator, price $800. High com. Liberty, heavy gears and shaft, like new, $1200. HS2-L props. $25 up. Hisso metal tipped tractor props. $20. OX pusher and tractor $15. Le Rhone $10. New OXX6 cylinders $10. OX2 motors $80 up. 7″ Shepard thread cutting lathe with tools, compound head and counter shaft, $50. Reliance heads $5. Essington Aviation School, Essington, Pa.

Experienced aviator desires position; able to furnish splendid references as to character and ability. Will consider any fair opening. Clinton M. Brill, Petersburg, West Va.

FOR SALE: 3-place OX5 Standard, in good condition, just set up ready to fly away. For immediate sale $775.00. Doretha Glenn, 4-15th Ave., Columbus, Ohio.

PILOT, Government training, two years' experience, all types. Will consider barnstorming, but would prefer to locate with reliable firm. Phil Van Meter, 1425 E. Douglas Ave., Wichita, Kansas.

WANTED: K-6 and C-6 motors and parts; price must be low. Robertson Aircraft Corporation, St. Louis Flying Field, Anglum, Mo.

Ten absolutely new and unused OX5 motors, in original crates, make offer. L. L. Adcox, 374 Wasco Street, Portland, Oregon.

HIGH LIFT WINGS: Pep up your old Jenny and make money. Our price will surprise you. New OX5's $325. Sportplane $350. Allison Airplane Co., Lawrence, Kansas.

Have three racing cars, one Fronty. Have won silver cup with this car, clocked at 118 M.P.H. Daytona Beach car cost $2700. to build; two years old; one 110 Dusenberg that will run 100 M.P.H. Also Hudson racing car that has won several races on beach. Dusenberg cost $1800., Hudson $1200. Will trade car or cars for plane or planes that are in good condition. Preferably Swallow, Travel Air, T.M. Scout or Yackey Sport. I also have real estate will trade. If you have a good plane and some trading blood, write or wire Johnnie Kelley, 307 Franklin St., Tampa, Fla.

WANTED: A few 45 hp. or 50-60 hp. Anzani engines, new or perfect condition and complete. Box 448, AVIATION.

FOR SALE: Jenny in excellent condition, newly overhauled OX5 motor, $800.00 cash. Lloyd O. Yost, Palmyra, Pa.

FOR SALE: Hisso Standard, one year old linen, A-1 condition, very reasonable. Inquire Alvene Litzenberg, 125 E. Jefferson St., Butler, Pa.

FOR SALE: JN4-D, with OX5 motor, all new fabric, ship A-1 condition, motor turns 1450, price $650.00 for quick sale. Chester A. Teeters, Kirwin, Kansas.

FOR SALE: Five slightly used, splendid condition, 160 hp. Beardmore, 6 cylinder motors, $325.00 each, or $1,500.00 for all. Ernest Dryer, 3665 W. 56th, Cleveland, Ohio.

FOR SALE: OX5 Canuck in good condition throughout. Ship has never been cracked or damaged. Will give flying instructions at slight additional cost. It is at a bargain price. J. W. Miller, 697 W. Palmer, Detroit, Michigan. Northway 0515.

WANTED: Small type land plane. Must be reasonable. Box 449, AVIATION.

FOR SALE: F5-L Hull and Dollie, nine copper tipped propellers; six radiators, also stabilizers, elevators, rudders, ailerons, and miscellaneous fittings. Address: F5-L, P. O. Box 117, Hampton, Virginia.

WANTED: To trade, racing car, Rago motor. Motor is new in original crate. Motor turns 5100 r.p.m. Car cost approximately $2,000. For good ship, preferably Jenny or Canuck, with OXX6 motor. Write Clarence Eggenberger, Pontiac, Illinois.

FOR SALE: OX5, JN4-D, ship and motor like new. Must be seen to be appreciated. $850.00 cash. H. B. Malette, Sterling, Ill.

WANTED: Experienced pilot for passenger work; State highway field. Very best location. Commission basis only (35%). J. J. Yellen, Perth Amboy, N. J.

FOR SALE: "Handy Manual of Aviation for the Amateur, the Beginner, and the Interested". Contains diagrams and cuts. $1.25 postpaid. Send check to: Everett D. Gunn, 1046 Amidon St., Wichita, Kansas.

FOR SALE: Curtiss F boat with M. F. wings, less motor, unassembled, price $200.00. Air Transport Equipment Co., Carle Place, Long Island, N. Y.

Model A Hisso $250. cash. Motor Overhauled by Navy at Pensacola, all new main and connecting rod bearings, pistons, valves and rings, total time 50 hours since top overhaul, 30 minutes flying, motor guaranteed and complete, good for 100 hours more. R. P. Applegate, 340 County Road, Palm Beach, Fla.

FOR SALE: A limited number of first Flight Pasco-Elko Air Mail round trip souvenir blank envelopes; were lost with pilot Rose for three days. R. A. Klinge, No. 301 Columbia St., Pasco, Washington.

FOR SALE: Wind-driven GENERATORS (Robbins & Myers) 13 volt, 33.6 amperes, streamlined, complete, $15.00 each; also good for Knight aerobatics. Genuine LIBERTY, black walnut, PROPELLER for den, souvenir and clock mounting, 15 inches long, $2.00 each. Spring balance scales, 3,000 lbs. capacity, at $75.00 each for weighing cargoes. CHERRY TRADING COMPANY, 46 Howard Street, New York City.

The Weekly Issue of AVIATION That You Miss

because you are not a regular subscriber, may contain the article, news story, picture or advertisement which you could have used with profit.

If you are a service or a civilian flier, AVIATION is an indispensable adjunct to your calling, because in each weekly issue it publishes more service and commercial flying news than appears in any monthly; and, more important, it is NEWS when it appears in AVIATION.

AVIATION

The Oldest American Aircraft Magazine — The Only American Aircraft Weekly

Who's Who in American Aeronautics

PUBLISHED BI-ANNUALLY

THE BLUE BOOK

OF

AMERICAN AIRMEN

Contains One Thousand Biographies of

Aviators, aeronauts, aeronautical engineers, aircraft manufacturers, flying officers of Army, Navy and Marine Corps, Air Mail personnel, aircraft accessories manufacturers, flying field owners, American aces, aeronautical instructors, inventors, National Guard air officers, aeronautical writers, sportsmen, men prominent in aeronautical affairs.

TWO HUNDRED ILLUSTRATIONS

PRICE — TWO DOLLARS

GARDNER PUBLISHING COMPANY
225 Fourth Ave., New York

Enclosed please find Two Dollars for copy of Who's Who in American Aeronautics.

Name .....

Address .....

City .....

The Aircraft Service Directory

WHERE TO PROCURE EQUIPMENT AND SERVICES

FLIGHT INDICATOR

PIONEER INSTRUMENT COMPANY

MAIN OFFICE AND FACTORY BROOKLYN NEW YORK

WASHINGTON 441 STAR BUILDING — PARIS 97 BOULEVARD SAINT MICHEL — SAN FRANCISCO 15 SPEAR STREET

TRADE **HAMILTON** MARK

PROPELLERS

OX5 water pump assemblies, $6.00. Exhaust manifold, each side $3.50. Crank case, lower half, $22.00, valve intake 30c. Valve exhaust 40c, Standard J-I upper wings, $50.00 to $100.00. Lowers $30.00 to $60.00. New Standard J-I airplanes, complete with motors, $900.00 up. Our stock is complete. Immediate delivery. Flying school open the year around. Write for new catalog.

NICHOLAS-BEAZLEY AIRPLANE CO.

MARSHALL, MISSOURI.

WILL BUILD TO YOUR GENERAL SPECIFICATIONS, SUBJECT TO APPROVAL, A

LIGHTPLANE RACER

POWERED WITH A WRIGHT-MOREHOUSE 25-30 H.P. ENGINE METAL CONSTRUCTION

FOR $1500.00 FLYAWAY WASHINGTON, R. I.—TERMS: $750.00 WITH ORDER, BALANCE ON DELIVERY. PLACE YOUR ORDER NOW TO BE IN TIME FOR THE RACES.

A. WELLINGTON COOK, WASHINGTON, R. I.

RECOVER YOUR SHIP NOW $95.00

NEWLY MADE GRADE A COTTON COVERS.

Complete set, Jenny $95.00; Canuck $100.00; Standard $105.00.

	JN.	CAN.	STD.		JN.	CAN.	STD.
Fuselage	14.00	14.00	14.00	Center sec.	3.00	3.00	3.00
Aileron ea	4.00	4.00-3.00	5.00	Rudder	4.00	4.00	4.00
Fin	1.75	1.75	1.75	Elevator ea	3.50	3.50	3.50
Turtle back	1.75	1.75	1.75	Upper wing	15.00	15.00	18.00
Hor. stab.	7.00	7.00	7.00	Lower wing	13.00	15.00	15.00

Fit guaranteed. *Send 25% with order.*

Sweebrock Aviation Co., 1117 Fairfield Ave., Ft. Wayne, Ind.

JUST COMPLETED: The purchase, moving and sorting of utility aircraft materials, sufficient to fill our new warehouse at Baltimore. Warehouse contains 20,000 square feet floor space. This arrangement will now enable us to give very prompt service. *Let us fill your wants.*

MONUMENTAL AIRCRAFT CO.

1030 N. Calvert St., Baltimore, Md.

The Safest Plane in America

"STALL-PROOF" PETREL

"LOW MAINTENANCE"

Five Years Without a Single Fatality

Write For Details on Our Commercial Models Four and Five

HUFF DALAND AIRPLANES, INC.

BRISTOL, PA.

New

— LIBERTY MOTORS —

WITH ALL THE LATEST IMPROVEMENTS.

CAN SUPPLY FROM STOCK ANY NEW "LIBERTY" PARTS DESIRED.

WRITE OR WIRE FOR PRICES.

JOHNSON MOTOR PRODUCTS, Inc.

518 West 57 St., New York.

C. FAYETTE TAYLOR, M. E.

Consulting Mechanical Engineer

Massachusetts Institute of Technology

CAMBRIDGE, MASS.

Specialist in Aeronautical Engines and Marine Engines

Air Spec. 10225D

SEAMLESS STEEL TUBING

Complete Warehouse Stock
for Immediate Shipment in any Quantity.

SERVICE STEEL CO. 1435 Franklin St. DETROIT, MICH.

MODERN *SAFE* *EFFICIENT*

WALLACE AIRPLANES

Duralumin Construction — Interchangeable High Lift Wings

High Lift Wings for Standard J-1, Curtiss JN-4 and Oriole

Flying Instruction — *Evening Shop Course*

Hispano Motors I-E $575.00 — New, OX5 Toothpick tipped $18.00

WALLACE AIRCRAFT CO.

4710-18 IRVING PARK BLVD. CHICAGO, ILL.

DECATUR AIRCRAFT COMPANY

DECATUR, ILLINOIS.

New and Used Ships for Sale

Parts for JN4D-JN4C or Standard J1 Ships
OX5-OXX6-Hisso or Liberty Motors
Complete Flying Course—$150.00

Write for our new catalog

YACKEY TRANSPORT

Liberty 12 motor. Landing speed is 32 miles per hour, high speed 125 m.p.h.; useful load 2400; ceiling with load 22,000 ft., duralumin construction throughout. Best performing ship ever known. Price $7,500.00.

Yackey Aircraft Co., Yackey's Checkerboard Airplane Field

DesPlaines River & Roosevelt Road FOREST PARK, ILL.

(Suburb of Chicago)

MICHIGAN DISTRIBUTION

OF

SWALLOW AIRPLANES

BY

GEO. E. TABRAHAM *Kalamazoo, Michigan*

AIRCRAFT SERVICE DIRECTORY
CONTINUED

INVENTIONS DEVELOPED

Patents Procured
If your invention is new and useful it is *patentable*—send me your sketch. Trade marks and copyrights obtained in the U. S. and Foreign countries. Consultation Free

INVENTION RECORDING BLANK SENT FREE
Sign your name below

NAME .....
ADDRESS .....

FREE BOOK
Z. H POLACHEK
PATENT ATTORNEY
CONSULTING ENGINEER
70 WALL ST.
NEW YORK

HASKELITE PLYWOOD
Only Plywood made to pass strict Grade "A" Navy Specifications.
Can be furnished in any size or thickness.
HASKELITE MANUFACTURING CORPORATION
133 W. WASHINGTON ST., CHICAGO, ILL.

EVERYTHING FOR THE AIRPLANE
Send for Our Catalogue
LARGEST AIRPLANE SUPPLY HOUSE IN THE WEST
A complete line of parts and accessories for aircraft at lowest prices.
A money-back guarantee on everything sold.
WRITE OR WIRE US YOUR REQUIREMENTS.
CRAWFORD AIRPLANE COMPANY
"Masters of the Air."
350 WASHINGTON BLVD. VENICE, CALIFORNIA

LUDINGTON EXHIBITION COMPANY
Passenger Flying
Instruction
Victor Dallin—Aerial Photography
AGENTS FOR WACO NINE
Spares of All Kinds
Sport Farman Ships
Aerial Taxi Service
Exhibition Flying
Office: Atlantic Bldg. PHILADELPHIA
Flying from Pine Valley Field PINE VALLEY, N. J.

The Reed Propeller *(Patented)* *FOREIGN DEPARTMENT*
In production by Licensees in principal foreign countries
Address—S. A. REED, 113 E. 55TH., NEW YORK, N. Y.
U. S. LICENSEE—Curtiss Aeroplane & Motor Co., Inc. Garden City, L. I.
WORLD'S SPEED RECORD—1923—Mitchel Field, L. I.
WORLD'S SPEED RECORD—1924—Istres, France.
PULITZER AND SCHNEIDER CUP WINNERS—1923-1925
PRESIDENT'S CUP—PRAGUE—1925
BEAUMONT CUP, Istres, France, 1925

Daniel Guggenheim School of Aeronautics
Courses in Aeronautical Engineering and Industrial Aviation. For particulars apply to the Dean of the College of Engineering,
N. Y. University, University Heights, New York, N. Y.

AERONAUTIC EXECUTIVE
Executive and expert mechanic available for connection with progressive company, six years experience in army and air mail ground work. I want to help you make money and expand in either operating company or factory. I am now employed. For particulars address Box 450, AVIATION.

OX-5 MOTORS

New OX-5's in original crates with tools	$350.00
New OX-5's built up in our factory	325.00
Rebuilt OX-5's new cylinder, new valve, etc.	275.00
Rebuilt OX-5's new cylinder, new valves and some other parts, slightly used	250.00
Overhauled OX-5's Government and our shop	225.00

ALL TESTED AND GUARANTEED
ANDERSON AIRCRAFT MANUFACTURING Inc.
ANDERSON, IND.

LE RHONE 80 & 120 H. P. ENGINES
and complete line spares for same.
Write for Prices.
TIPS & SMITH, INC.
P.O. BOX NO. 153 HOUSTON, TEXAS.

SHIPS FOR IMMEDIATE DELIVERY

JN4D's	$750.00 & UP	COMET OX5	$2000.00
HISSO JENNY	1500.00	COMET K6	4000.00
REBUILT C-6 STANDARD			1750.00
SPECIAL OX5. RACER, METAL PROP.			2500.00

Used and new OX5 motors, airplane parts and supplies.
G. S. IRELAND, GARDEN CITY, N. Y.

FLOTATION GEAR
AIR BAGS, FLOTATION and FUSELAGE AIR BAGS TO ANY SPECIFICATION OR DESIGN
Also Rope, Wire, Canvas and Fabric Work
THE R.F.D. COMPANY 17 Stoke Road, Guildford, Surrey, England
Cable Address: "Airships", Guildford

PARAGON PROPELLERS
BETTER THAN EVER
Paragon Engineers, Inc.
Baltimore, Maryland

Booster Equipment for Berling Magnetos
Do not take the risk of seriously injuring or even killing some one by not using this equipment. New production parts necessary to change the D81 Berling Magneto sent prepaid for $8.00 cash with order. Complete equipment including Booster Magneto for $20.00
Have you received our catalog number 3 of JN parts and supplies?
YOU CAN HAVE ONE FOR THE ASKING.
KRIEDER-REISNER AIRCRAFT CO., INC.
HAGERSTOWN, MARYLAND.

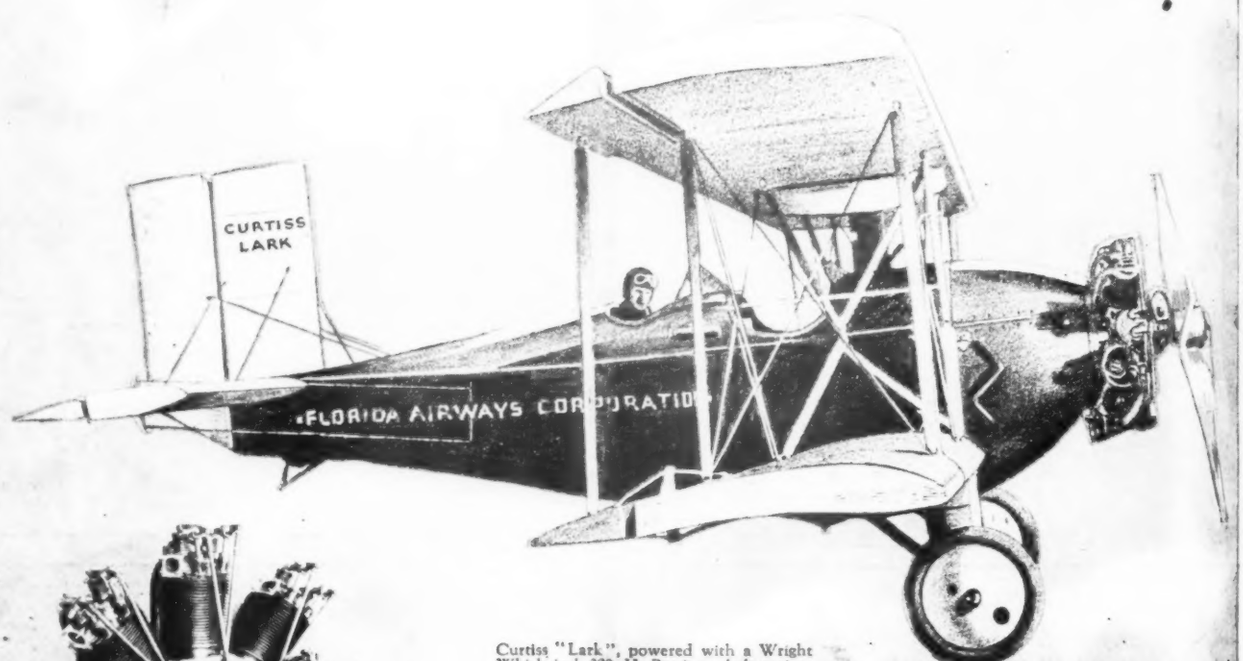
Second Successful Year *Second Semester begins April 19, 1926.*
Tri-State School of Aeronautics
FARMERS TRUST BUILDING.
FORT WAYNE. IND.
MORE THAN JUST A FLYING SCHOOL.
Tuition Reasonable *Enroll Now.*

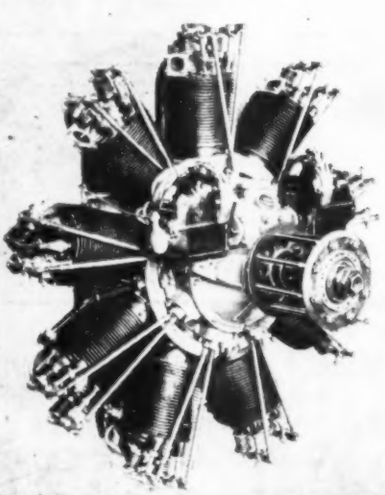
More Pilots Know More About

WRIGHT WHIRLWIND ENGINES

than any other Aeronautical Engine now manufactured in America!

That's why *More Pilots fly them!*





Curtiss "Lark", powered with a Wright Whirlwind 200 H. P. air-cooled engine, equipped with Curtiss-Reed metal propeller. Designed for passenger and mail transportation. *Send for Bulletin No. 8.*

WRIGHT

WRIGHT AERONAUTICAL CORPORATION

Paterson, N. J., U. S. A.